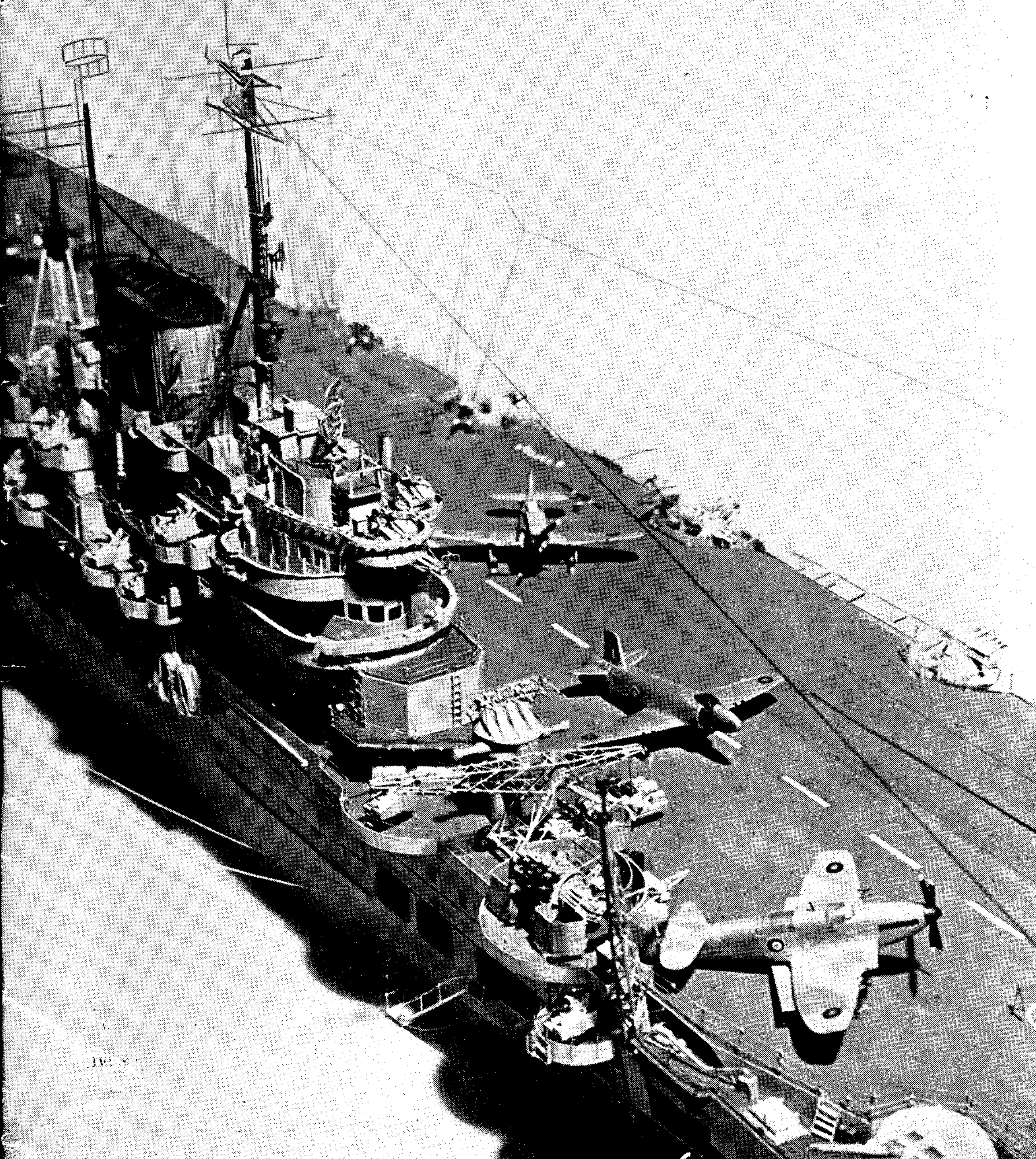
Vol. 104 No. 2610 THURSDAY MAY 31 1951 9d.

THE MODEL ENGINEER



The MODEL ENGINEER

PERCIVAL MARSHALL & CO. LTD., 23, GREAT QUEEN ST., LONDON, W.C.2

31ST MAY 1951 VOL. 104 NO. 2610

SMOKE RINGS

The Utility of Models

● WE HAVE often referred to the growing tendency for manufacturing firms and other business concerns to use models as a means of demonstrating to the public the main features of manufactured products of all kinds. The South Bank Exhibition provides ample evidence of this tendency, for there is a splendid variety of models to be seen there. Aeroplanes, ships, locomotives, trains, motor-cars, and omnibuses are, perhaps, the most prominent examples, and all the models are excellent. We have seen and admired several of them before, but there are some new ones, and we welcome them.

A miniature of any sort has its own intrinsic fascination to expert and layman alike, and it never fails to attract attention. And once that attention has been attracted, most people will begin to look for any special features which are often more readily noticed and appreciated in miniature than they are in full size. For this reason, a model possesses an inestimable commercial value which more than justifies its cost, in addition to which its historical significance must ever increase with the passage of time.

Away with the Blues!

● WE ARE not altogether surprised to learn that British Railways propose to discontinue the use of blue as a colour for express passenger locomotives. After nearly three years of thorough trial during which blue and green have been in use as colours for, respectively, two separate categories of passenger engines, rumours began circulating to the effect that one or other colour was to be abandoned. After all, there seems no logical reason why two different colours should be in use at the same time, even if passenger engines must, of necessity, be divided into more than one category; so the proposal to adopt one colour for all passenger engines is to be welcomed.

The colour to be adopted is largely a matter of personal taste; but a final decision must also be governed by considerations of expense and durability. We understand that it will be green, but the particular shade has not been specified, at the moment of writing this note. We also hope that the opportunity will be taken to revise the catagory of certain classes such as the Southern Schools, Western Saints and others, which are rightly *passenger* engines but, for some unspecified reason, are painted black. It seems to us that such engines can hardly be regarded as mixed-traffic types to be included in the "black" list.

Presumably, the new order will also apply to essentially *passenger* tank engines; if it does, a greater degree of uniformity will be the result, and we have no doubt that it would give rise to much satisfaction to enthusiasts.

A Friendly Offer

● MR. C. M. BALFOUR, The Chalet, Narberth Road, Tenby, Pembroke, has written to make a friendly offer to any reader who may be intending to spend a holiday in Tenby ; to any such reader Mr. Balfour writes : " If he would care to slip that partly-finished bit into his suitcase, he will be welcome to get on with it in my small workshop on wet afternoons, which are not unknown in West Wales. I have a Myford M.L.4, rather old but reasonably accurate, a ¼-in. Champion drill and most of the usual accessories. In case the same idea occurs to several people, and things get out of hand, I recommend a previous call earlier in the day. Small contributions in cash or kind towards upkeep, though not an essential part of the scheme, would be welcome, and an opportunity to pick the brains of experts would be even more welcome."

While we naturally hope that all readers on holiday will be favoured with good weather to enable them to enjoy to the full the complete change they desire, we like Mr. Balfour's frank and friendly gesture which, we think, can be acted upon to the mutual advantage of those concerned.

Long-distance Appreciation

● WE HAVE, on previous occasions, remarked on the fact that model engineering has often been known to act as a tonic in cases of both nervous and physical illness. Today, the value of an interesting occupation or pastime is fully recognised by the medical profession, and " occupational therapy " is an established part of the treatment in many hospitals and convalescent institutions. Among the many letters we have received from readers informing us how model engineering has helped to restore their health and strength, we think it may be well worth while to quote one received recently from a reader in Brisbane, Australia. He states : " It is only just recently that I have taken up model engineering. After I was discharged from the Australian Military Forces, I was, even up to a few weeks ago, practically at my wits' end trying to settle down and straighten my nerves. Picking up one of your journals, I became interested, and decided to take up model engineering. The constructive effect that has had on building up my nerves, besides helping me to look forward to a brighter future, is truly amazing—even my doctor says so. Your journal is the best I have ever read, and I wish it all success in the future. It is the best value for money I have ever had the pleasure of reading. May I say : Many thanks."

A Game Veteran

● FOLLOWING UPON our recent announcement concerning the withdrawal of British Railways Western Region locomotive No. 4003, *Lode Star*, for preservation, readers may be interested to learn that, at the moment of writing, this engine is still in traffic. Moreover, she seems to be an unusualy active veteran because, in spite of 44 years of strenuous service, she worked the 11.35 a.m. South Wales express as recently as Saturday, May 5th last. This train runs on Saturdays only and covers the 133½ miles from Paddington to Newport non-stop, in 2½ hours. On May 5th, the old engine, with a ten-coach train behind her and going well without the least sign of distress, or even of being especially forced in any way, passed Maidenhead at 12.7 p.m., the first 24 miles of her long non-stop journey having been covered in 31 minutes—assuming a punctual start from Paddington. This is quite good going, whatever the engine ; in fact, it is the usual passing time for expresses from Paddington. For a 44-year-old engine, the time is good in view of the fact that she had started " cold " and was hauling some 300 tons of train. No fuss, no bother, and going at a steady 65 m.p.h., she provided a sight to gladden the heart of anyone who appreciates the work of the great G. J. Churchward who, with his " Star " class of four-cylinder 4-6-0 express passenger engines, achieved a triumph that is to be commemorated by the preservation of *Lode Star* when, at last, her time for withdrawal arrives. These engines have outlasted all their contemporaries on top-link main line work, and they have thoroughly vindicated the genius of their designer.

Hon. Secretary, Leicester S.M.E.

● WE LEARN that Mr. E. A. F. Dallaston has found it necessary to retire from the position of hon. secretary of the Leicester Society of Model Engineers, and we regret to note that one of the reasons is due to poor health. Mr. Dallaston joined the society in 1934, was elected a member of the committee in 1935, joint secretary in 1936 and, finally, took over the secretaryship in 1946.

The society will miss his active executive abilities, we are sure, and we know that he has done a very great deal in placing the society in the prominent position it is in today.

We offer our best wishes to him and hope that, by relinquishing his arduous task, he may soon be fully restored to health and able to devote more time to model making.

Mr. Dallaston's successor is Mr. A. F. Allsopp, whose address is 25, Dunster Street, Leicester.

A Novel Tramway

● AT MARINA, St. Leonards, a novel tramway has been installed on the promenade and will provide an unusual attraction during the coming season. It extends from the bathing pool to a point opposite the eastern end of Grosvenor Gardens. At the moment, we have no particulars of dimensions, but, judging from a photograph we have seen, the trams appear to be about half-size. One is a single-decker and can carry eight passengers ; another is a handsome double-decker carrying fourteen passengers ; it is, externally, a replica of the latest type of so-called streamlined car, and seems to be about 8 ft. high from rail level to the top of the roof.

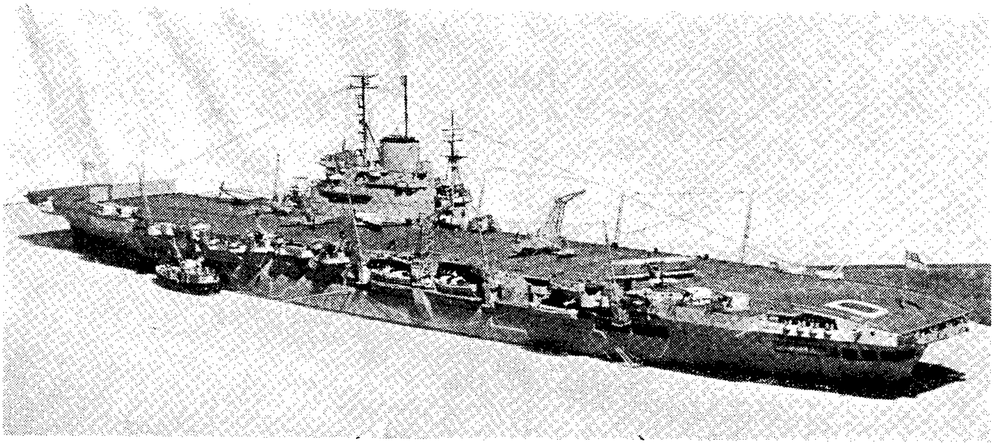
In these days, when trams are disappearing from most of our great cities, it is interesting to note that Mr. C. W. Lane, a tram enthusiast who has built these miniatures, seems determined to ensure that the tram shall not become a forgotten memory. His trams at St. Leonards are stated to be the smallest of their kind in the world ; they are operated electrically from overhead supply lines, have electric brakes and can attain a speed of 12 m.p.h.

H.M.S. "ILLUSTRIOUS"

A New Model for the Royal United Service Museum

by Norman A. Ough

IN June, 1949, I was commissioned by the late Captain Altham, of the Royal United Service Institution, to make a model of the aircraft carrier, *Illustrious*, in continuation of the series of models of present-day warships which I have been making for the institution for the past 25 years. The model was begun in July, 1949, and finished in April this year—a period of 21 months.



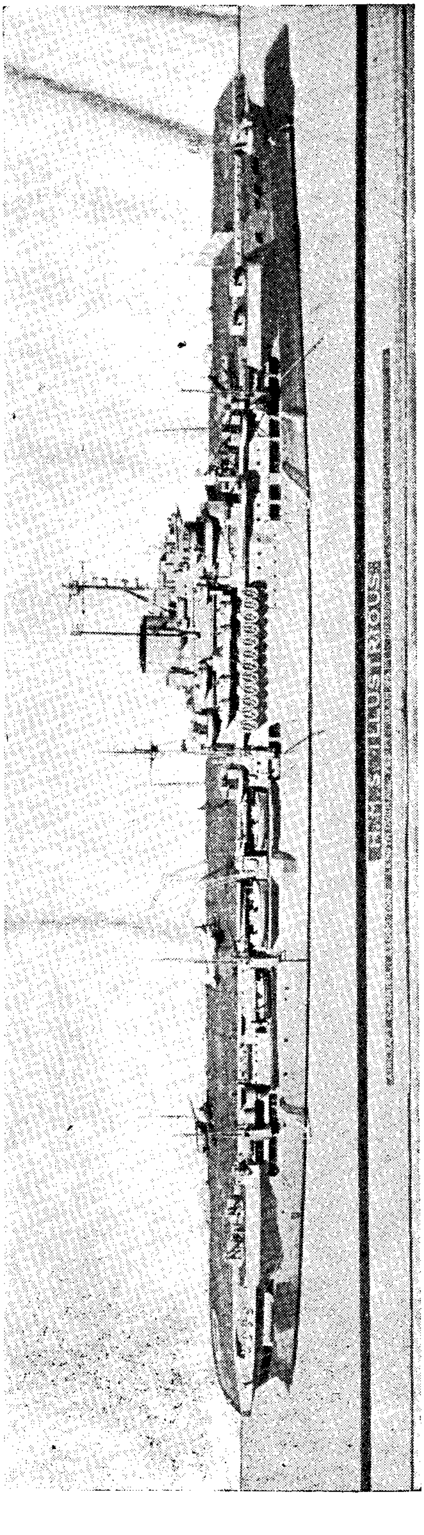
Model of H.M.S. "Illustrious." View from port quarter. A motor fishing vessel of the type now used as tenders to the fleet, in place of the former steam drifters, can be seen alongside

The models in this series are all made to the water line, they are of uniform scale, 16 ft. to 1 in., and are as fully detailed as possible. Unlike the builders' models, each represents the ship as in commission, at anchor and with the lower booms extended and the accommodation ladders down, the intention being to give a portrait of the actual ship as an individual vessel, and showing the small differences which distinguish her from others of the same class.

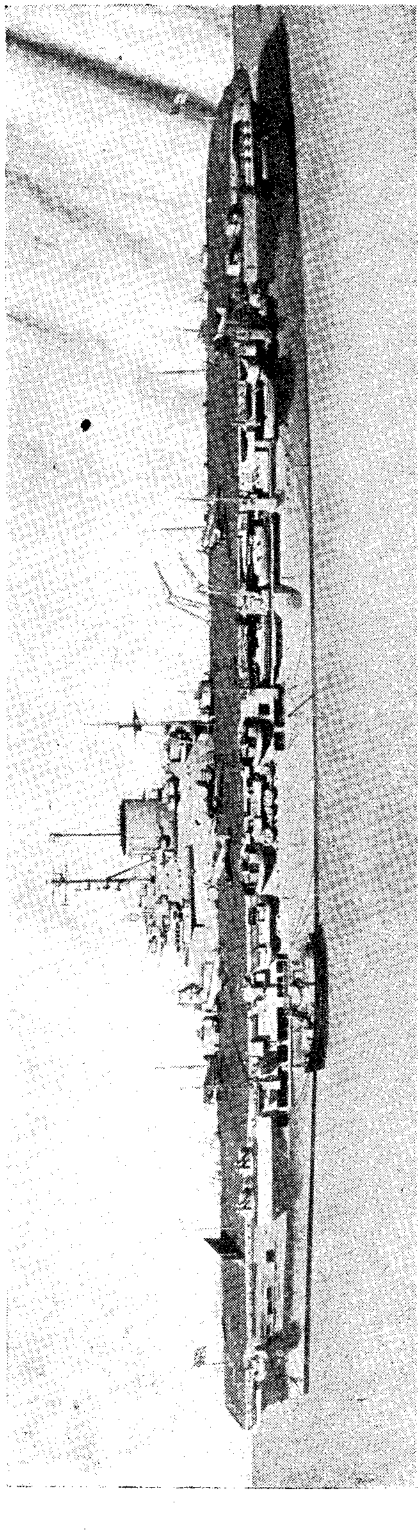
The *Illustrious* was the first fleet aircraft-carrier to be completed after the outbreak of war. She was in action at Taranto, in November, 1940, when her "Swordfish" aircraft dealt a crippling blow to the Italian fleet as it lay in harbour. On this occasion three battleships were put out of action, the *Conti di Cavour* sustaining injuries from which she did not recover during the war. (On the model a "Swordfish" 'plane is shown at the after-end of the flight deck near an aerial mast.) During one of the Malta convoys early in 1941, the *Illustrious* was attacked six times by enemy aircraft and in a final onslaught by 40 German dive bombers she was set on fire fore and aft, but she fought through to Malta with her helm out of control, and received temporary repairs in spite of further air attacks. The damage was so extensive as to require a refit in an American dockyard. Returning to the fleet, she was present in 1942 at the occupation of Diego-Saurez in Madagascar, and at the Salerno landings in 1943. Moving to the Indian Ocean and the Pacific, she took part in raids on oilfields in Sumatra in 1943 and on the naval base at Sourabaya; also, in attacks on Port Blair in the Andaman islands, and on the port of Sabang in Sumatra. In the early months of 1945, flying the flag of Admiral Sir Philip Vian, she was one of the carriers whose aircraft wrecked the oil refineries in Southern Sumatra and in the attack on the Ryukyu islands, south-west of Japan. Since the war she has been in active commission, recently being engaged on deck-landing trials of new types of aircraft, including the jet plane *Attacker* (the second 'plane from forward on the flight deck of the model).

The *Illustrious* was laid down at Vickers-Armstrongs' yard at Barrow, in April, 1937, launched April, 1939, and completed in May, 1940. Her length is 753 ft. overall, beam 95 ft. and draught 24 ft.—the displacement being 23,000 tons. She carries sixteen 4.5 in. high-angle guns in eight twin mountings, 17-40 mm. Bofors guns and twelve Oerlikons, besides 5-8 barrelled two-pounder pom poms. Her engines develop 110,000 shaft horse-power, giving her a speed of 31 knots.

In making a model of an aircraft-carrier of this class, one begins with the flight deck and works downwards. The long rectangle of this deck



Starboard side



Port side

(on any model) to keep control of colour—what artists call " values "—nothing must be allowed to " get out of key," and very bright colours must be suppressed. The flight-deck marking, for instance, are several tones darker than in reality, otherwise they would be too emphatic: many fine models are made to look commonplace by too bright colour.

So much experience of making detailed models of ships has led me to apply some of it to the detailed working model, radio controlled. With control, the chances of loss or damage are much reduced and a high standard of workmanship and much elaboration can now be put into one's ship.

It is often said—too often—that the hull of a power-driven model, either steam or electric, must be modified to take the engines or whatever plant is used. In my opinion, this view is quite false, and its wide acceptance has spoilt the pleasure (and the models) of many enthusiasts who like realism. Nearly all real ships are very long in form, nearly all working models are made too short. Additional displacement is achieved by making the hull the correct length in proportion to beam. After that, it has to be made as light as possible, the weight of all superstructure cut down to a minimum, and any spare bouyancy cancelled by means of ballast made flat and placed very low down until the correct free-board is reached. A hull can be carved from wood up to the waterline (thus getting over the difficult forms), hollowed very thin and the rest built of tinplate strakes and the ports drilled as before mentioned. The most elegant and elaborate superstructures can be built as light as an eggshell from thin tinplate (a cocoa tin is 0.012 in. thick) and the flat parts of the bottom of the wood hull cut away and replaced by tin, so bringing the flat lead ballast still lower. On test, it is remarkable how much stability a model of a cruiser has when made in this way with all the weights on board. An accurate model can serve two purposes; it can be contemplated and elaborated at home, and be a delight to the eye at sea. With radio control the turning circle can be established, speed over a scale mile ascertained, and it can be given infinite control of speed and helm ahead and astern, on both engines. Finally, although it is doubtless a matter of indifference to small boys—the guns can be fired by remote control with telling effect!

The model of the *Illustrious* is now in the Special Exhibition for the Festival of Britain at the Royal United Service Museum, in Whitehall. It will become part of the permanent collection of ship models in the museum in September.

The cover picture on this week's issue shows a view of the fore end of the " Island " on the model of the *Illustrious*.

[Articles such as the above are usually to be found in our companion magazine, *Model Ships and Power Boats* (published monthly, price 1s.), but occasionally, due to considerations of space and where the interest is largely mechanical, as in this instance, they are inserted in these pages. Readers who are interested in marine modelling in any of its numerous phases, such as miniatures, historical and modern ships, working and exhibition models, yachts and hydroplanes, should obtain a copy of " M.S. & P.B." from their newsagents—ED., " M.E."]

For the Bookshelf

Racing Cars in Miniature, by Rex Hays. (London: Percival Marshall & Co. Ltd.) Price 7s. 6d.

The majority of readers of THE MODEL ENGINEER will already be well acquainted with the name of the author, and a great number of the luckier ones will at some time or other have been afforded the opportunity of inspecting some of the magnificent scale models of racing cars constructed by him over a number of years. In *Racing Cars in Miniature*, will be found the secrets of Mr. Hays' methods of construction, written in a style which will appeal to all who are interested in this fascinating branch of model engineering.

Beginning with the foreword by that well-known personality, R. L. Walkerley, *Grand Vitesse* of *The Motor*, the following chapters are well illustrated with line drawings and half-tone plates of models representing famous prototypes, including the 158 Alfa Romeo, the 3.3 litre Bugatti, D-type E.R.A., three-litre Mercedes Benz, Auto Union, P.3 Monoposto Alfa Romeo and, of course, the well-known and loved 4½ litre Bentley. This book is undoubtedly a *must* for all those who are interested in producing scale models of their favourite prototypes; it will also be of considerable assistance to the many who are now turning their attention to miniature Grand Prix rail circuits.

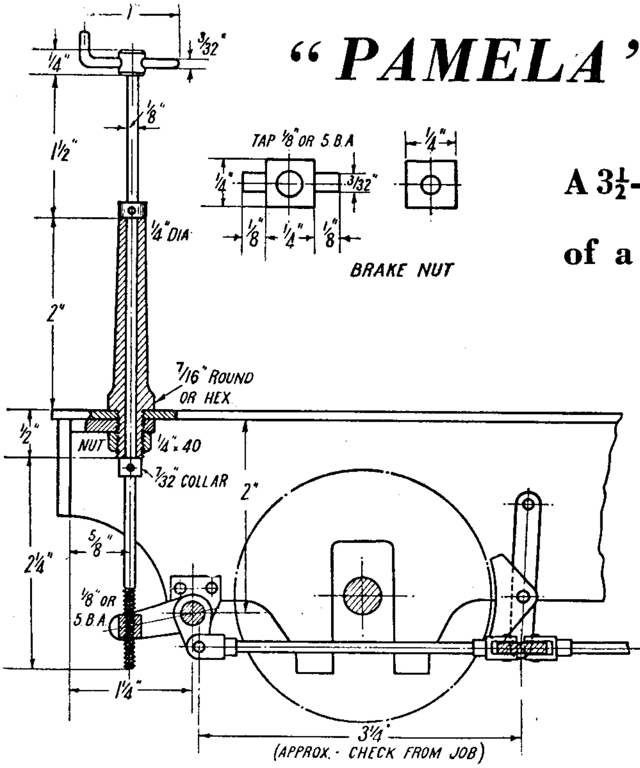
World Railways, compiled and edited by Henry Sampson. (London: Sampson Low, Marston & Co. Ltd.) 600 pages, size 12½ in. by 8¼ in. Fully illustrated. Price £3 3s. net.

Many readers will be familiar with those comprehensive reference books, *Jane's Fighting Ships* and *Jane's All the World's Aircraft*; this third and latest volume, *World Railways*, is a companion to the other two. The information it contains is up to date and may be regarded as a survey of the equipment and operation of representative railway systems all over the world. Each railway is dealt with in the same systemmatic order, which greatly facilitates the comparison of one railway with another, as regards the widely differing conditions in which the world's railways were originally planned and are operated.

The illustrations include 102 maps, 696 photographic reproductions and 420 diagrams; the majority of the last-mentioned are for locomotives of different kinds, but many coaches and other equipment are included. Generally, the diagrams are more sketchy than technically accurate; but, in most cases, they are supplemented by photographs, and the principal dimensions, other than those shown on the diagrams, are tabulated alongside. Model makers are undoubtedly among the very large body of railway enthusiasts to whom this remarkable book should be of interest and use.

"PAMELA" by "L.B.S.C."

A 3½-in. Gauge Rebuild of a Southern Pacific



How to erect brake gear

As the tender brake gear on our little ex-spam-can is of my "standard" pattern, adapted from full-size practice, and is similar to that specified for *Doris*, *Maid of Kent*, and other engines described in these notes, a condensed "running commentary" should enable all builders to do the job satisfactorily. The only fundamental difference is in the size of the parts, and slight variation in erection; and the accompanying illustrations give all the details. The hanger pins are turned from ¼-in. mild-steel rod, to the given sizes, whilst the hangers themselves are filed up from ¼ in. × ⅛ in. flat steel, and drilled as shown. At the time of writing, cast-iron is not on the "reserved for bloodshed and destruction" list, so maybe our approved advertisers who specialise in small castings, could supply cast-iron brake blocks *a la* full-size practice. This would save work; otherwise, the brake blocks will have to be carved out of mild-steel bar, in the manner specified for the blocks on the engine. Six "units" are required, each consisting of brake block, hanger, and hanger pin; and these are assembeld as shown in the end view. The block is pinned to the hanger so that it is free enough to adapt itself to the wheel tread when the brakes are applied, but at the same time it should be stiff enough to retain that position when the brakes are off. If too free, the blocks will lap over when released, and one end will be rubbing on the wheel tread all the time; this, naturally, isn't too good for either wheel tread or brake block. The assembly goes inside the frames, the screwed spigot of the hanger pin going through the hole in the frame; an ordinary commercial steel nut on the outside of the frame, secures the lot. I would advise fitting very small spring washers (commercial article sold by the advertisers who supply sundries for my engines) under the nuts, as the tender usually gets plenty of shaking up when the engine is in regular service.

Hand Brake Column

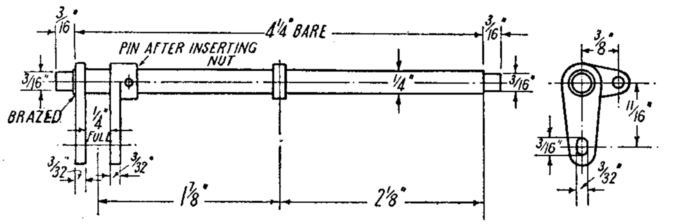
The bit of apparatus that tests the fireman's muscles, is self-contained and self-supporting on this engine. Incidentally if the brake-fitter and his mate at our old running-shed, found a bent handle, your humble servant invariably got the blame for it! But it was a case of "not guilty," for most of the engines carried a piece of iron-pipe from three to four feet long, to shut off the water gauge cocks in the event of a burst glass; and some of the firemen would use this as an extra lever on the brake handle, to hold a 60-wagon train on down grades like Ockley Bank. Similarly, in the old days, brakemen on American freight trains used a stout hickory stick, known as a brake club, which they put between the spokes of the brake wheels on the box cars and other vehicles, to get more leverage when "tying 'em down," as they called it, when descending long inclines.

The actual column which forms the bearing for the spindle, may be turned from a casting, or from a piece of $\frac{7}{16}$-in. rod either round or hexagon, 2½ in. long. Chuck it in the three-jaw, face the end, centre, and drill a No. 30 hole clean through. I have already explained how to extend a drill by brazing on to the shank, a piece of round steel the same size, or a wee bit smaller. You can drill a hole as deep as you like, provided that

you keep withdrawing it to clear the chips out of the flutes. A long $\frac{1}{8}$-in. D-bit would also do the job. Turn down $\frac{1}{2}$ in. of the end to $\frac{1}{4}$ in. diameter, and screw $\frac{1}{4}$ in. × 40. Reverse, and rechuck in a tapped bush held in three-jaw; bring up the tailstock centre to support the overhang, and turn the outside to the taper shown. Make a nut from $\frac{3}{8}$-in. hexagon rod, to suit the screwed end.

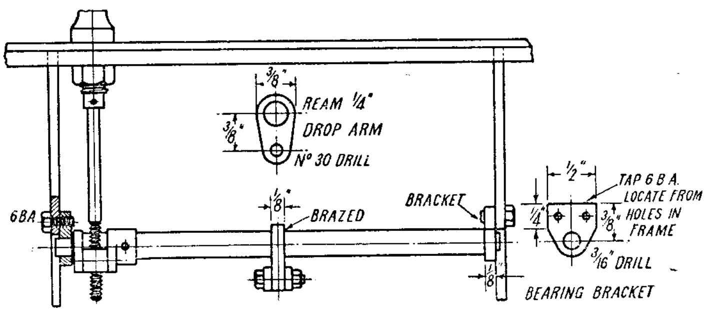
A piece of $\frac{1}{8}$ in. round silver-steel approximately $6\frac{1}{2}$ in. long, will be needed for the brake spindle. One end of this is screwed $\frac{1}{8}$ in. or 5 B.A. for about $\frac{7}{8}$ in. length. A boss made from $\frac{1}{4}$-in. mild steel is silver-soldered to the plain end, and drilled No. 43 to take a cross handle made from 3/32-in. round steel as shown; this should be a press fit. Round off the ends, or the fireman will say a tidy mouthful when he catches hold of it! Make two collars from $\frac{1}{4}$-in. rod, to fit tightly on the spindle; note, the bottom one must be not more than 7/32 in. outside diameter, so that the $\frac{1}{4}$-in. nut at the bottom of the spindle, can pass over it when erecting the complete assembly. Pin the upper collar to the spindle at $1\frac{1}{2}$ in. below the handle; then poke the spindle down the column, and put the other collar on below it, pinning it in place. The spindle should turn freely without having any appreciable up-and-down movement. To erect the column, simply drill a $\frac{1}{4}$-in. clearing hole $1\frac{7}{8}$ in. from the centre-line of tender, and $\frac{5}{8}$ in. from the front edges of frames, back of the drag-beam. When measuring from the top, allow for thickness of drag-beam, and overhang of soleplate. Put the screwed spigot of the column through the hole, and secure with a nut made from $\frac{3}{8}$ in. hexagon rod.

The brake shaft is made from a piece of $\frac{1}{4}$ in. round steel $4\frac{5}{8}$ in. long. Turn down a full $\frac{3}{16}$ in. of each end to $\frac{3}{16}$ in. diameter. The drop arm which actuates the pull rods goes slap in the middle, and is filed up from $\frac{1}{8}$ in. × $\frac{3}{8}$ in. flat steel, to the given sizes. Drill as shown, then squeeze it on to the shaft. The actuating arms which carry the brake nut, are filed up from 3/32 in. × $\frac{3}{8}$ in. steel (I keep all my odd scraps, such as frame trimmings and other offcuts, for jobs like these); one is plain, and the other has a boss brazed on to it. The boss is made from $\frac{3}{8}$ in. round steel, and attached in the manner I have described umpty times already. Assemble as shown, leaving the bossed arm loose on the shaft; adjust the plain arm and the drop-arm to their correct positions, at right-angles, and braze them to the shaft. Simply apply wet flux, blow up to bright-red, and touch the joints with a bit of thin soft brass wire, or a piece of $\frac{1}{16}$-in. bronze welding wire of any good make. Quench in clean water only, and clean up.



Brake shaft

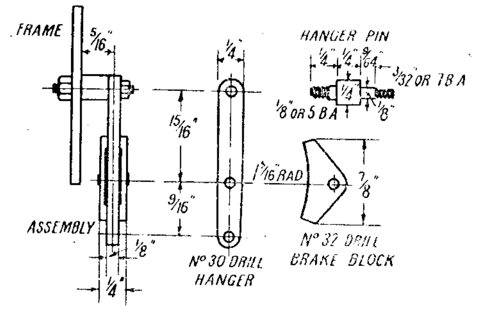
The nut is turned from a bit of $\frac{1}{4}$ in. square rod—bronze for preference, but steel will do; don't use soft brass or "screw-rod"—held truly in four-jaw. Turn one of the trunnion pins, then part off at $\frac{1}{2}$ in. from the end; reverse in chuck and turn the other trunnion. Drill a No. 40 hole through the middle, and tap it $\frac{1}{8}$ in. or 5 B.A. to match the thread on the spindle in the brake column. Put it in place between the plain and the bossed arm on the brake shaft, adjust the latter so that the nut is just free to turn and no more, then pin the bossed arm to the shaft by drilling a No. 43 hole through the lot, and squeezing in a pin made from 3/32-in. round steel.



How brake shaft is erected

The brake shaft is carried in two bearing brackets, which are cut from $\frac{1}{8}$-in. sheet brass to the size given in the illustration. Drill the

$\frac{3}{16}$-in. holes for the shaft journals first; then, at the bottom of the first curve in the tender frame, drill two No. 34 holes for the fixing screws. These are $\frac{1}{8}$ in. from the bottom edge, and about 9/32 in. centres. Temporarily clip a bracket in place inside the frame, so that the $\frac{3}{16}$-in. hole is $1\frac{1}{4}$ in. from front edge, and 2 in. from the top, as shown in the drawing of the complete assembly. Run the No. 34 drill through the holes in the



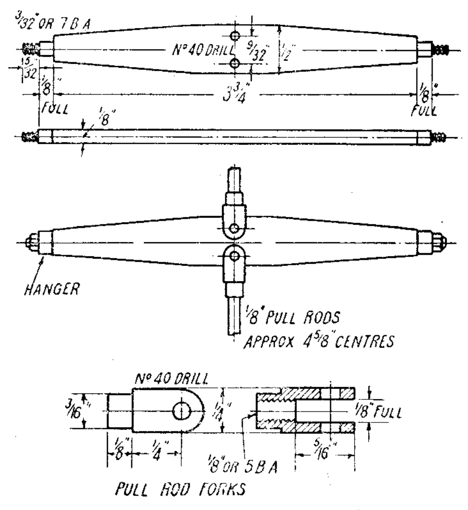
Brake blocks and hangers

frame, making countersinks on the bracket; follow with No. 44, drilling through bracket, tap 6 B.A. and put two screws in. I have shown hexagon heads, but any kind available will do. Put the brake shaft in place with the other bracket on the end of it; set it level, also square across the frames, then ditto repeato the fixing job on bracket No. 2. Unscrew the nut on the bottom of the brake column, lift it up, enter the thread into the nut between the longer arms of the brake shaft, screw it up a little, and replace the nut holding the column. The shaft should work easily when the brake handle is turned.

Beams and Pull-rods

The three brake beams are made from $4\frac{5}{16}$ in. lengths of $\frac{1}{2}$-in. $\times$ $\frac{1}{8}$-in. flat steel Chuck truly in four-jaw, and turn each end to $\frac{1}{8}$ in. diameter for a full 9/32 in. length; further reduce 5/32 in. length to 3/32 in. diameter, and screw 3/32 in. or 7 B.A. The beams can then be milled or filed to the shape shown. Two of them have No. 40 holes drilled on the cross centre-line, 9/32 in. apart; the trailing beam needs only one hole, for obvious reasons. A beam is then placed between each pair of hangers; this can easily be done, if the nuts holding the hanger pins are slacked off, but don't forget to tighten everything up again when the beams are in place. A commercial nut and washer on each of the small screwed parts at the ends of the beams, will keep the hangers in place. In full-size practice, washers and cotters are usually employed on this part of the business; but, as I've remarked before, the slavish copies of full-size practice which many folk so dearly love, are only fit for "glass roundhouses." If an engine is required for real hard work, it has to be designed to suit the rail gauge. It is the *principles* that matter!

All that remains, is to couple up the brake shaft and the beams, with plain pull-rods as shown. There is not the slightest need to fit compensating gear; in the first place, it would be a useless refinement, anyway, and with most folk, spare time is too precious to waste on unnecessary work. Secondly, many full-sized engines have no compensating gear, as it is found that if the brake blocks are properly adjusted in the first place, a very few brake applications will suffice to ensure even pressure on all the brake blocks. The pull-rods are simply pieces of $\frac{1}{8}$-in. round steel rod screwed $\frac{1}{8}$ in. or 5 B.A. at each end. The forks are made in exactly the same way as valve-gear forks, fully described for *Tich* and other engines in this series. Just a reminder to beginners—if you cut three pieces of $\frac{1}{4}$-in. square steel rod about 2 in. long, or any length to suit your slide-rest tool clamp, you can go ahead and slot both ends of each, whilst you have the cutter on its spindle in the chuck. Then cut off the slotted ends to approximate length, chuck each in four-jaw, turn the boss, drill, and tap; if you slack Nos. 1 and 2 jaws of the chuck each time, you can chuck the "next man in" as easily as if you were putting round rod in the three-jaw. Round off the slotted ends, drill the cross-holes for the pins, and you're all set. If I forget to drill the cross-holes before slotting the forks, which is really the best way—being a human being and not an infallible tinpot deity, I have an occasional lapse!—I put a scrap bit of metal between the jaws of the fork, and drill through the lot. It ensures that the drill



Brake beams

will not wander off the road when entering the second side of the fork. Another of the little things that matter!

The drawings give the approximate length of the pull-rods between the centres of pinholes. Check these off from the actual job. Turn the tender upside down on the bench, press the brake blocks against the wheel treads, and have the nut on the brake spindle a little more than

halfway up the thread ; then measure the distances between the holes in the brake beams, and the drop-arm on the brake shaft. Adjust the forks on the pull-rods to the measurements obtained, and put them on. You can either use pins, or bolts made from bits of 3/32-in. silver-steel or 13-gauge spoke wire, screwed and nutted at both ends, as shown in the drop-arm in the illustration of the brake shaft erected. No pull-off springs are required, because when the brake handle is turned anti-clockwise, it pushes down the double levers, forces the drop-arm back, and shifts the brake blocks clear of the wheel treads. Next and final stage, drivers' brake valve, and electric lighting.

Reversing Loose Eccentrics

The rack-and-pinion method of reversing loose eccentrics, described on page 501 of April 19th issue, which Mr. Claxton says he saw in a mechanical journal some years ago, is actually nearly as old as the loose eccentric itself. In fact, I referred to it in some of my very early notes, and also gave a simpler idea, adapted from a gramophone motor clutch. Various other devices have also been put forward from time to time. However, the point is just this—the advantages of the loose eccentric gear are, first of all, *its extreme simplicity* ; and secondly, it is the ONLY valve gear in the whole range which gives equal port openings, in both directions, at each end of the stroke. Against this is the disadvantage that it cannot be notched up ; and for economical working, it has to be set for an early cut-off, which cannot be less than 50 per cent., or the engine will often fail to start, owing to both ports being closed.

Now, if you are going to take the trouble to rig up a more or less complicated reversing arrangement of rack and pinion, rods and levers, or any other contrivance, you not only spoil the simplicity of the loose eccentric gear, but actually waste your time ; because you might just as well fit the other eccentric, add a link, couple it to the lever, and enjoy the benefit of a full Stephenson link motion which *can* be notched up !

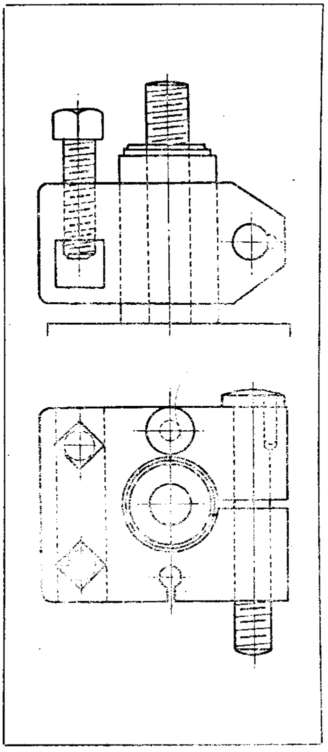
Tool Holder Block for the M.L.7 Top Slide

by L. A. Watson

As a supplement to my recent article in the issue of April 5th, 1951, dealing with a tool holder block for the M.L.7 cross slide, I give here a simple design for an adjustable tool block for the top slide.

Admittedly, many amateurs prefer to remove their top slides when doing general turning and I do this myself, as it leaves so much more room on the cross slide table. Taper turning, however, brings the top slide into use and it is then that the correct height of tools assumes the greatest importance.

The block shown can be made from a piece of black or bright mild-steel and measures about $2\frac{1}{2}$ in. long by 2 in. wide and $1\frac{1}{4}$ in. deep. Lest the square hole for the tools presents a difficulty, let it be said that a round hole would serve. I have used round holes in boring bars for carrying square shank cutters, and readers may like to know that the measurement across corners of a square shank can be calculated by multiplying the length of the side by 1.4142. I give a few common sizes with the corresponding circular hole diameter. $\frac{3}{16}$ in. square requires 17/64 in. round hole ; $\frac{1}{4}$ in. square requires 23/64 in. round hole ; $\frac{5}{16}$ in. square requires 29/64 in. round hole; $\frac{3}{8}$ in. square requires 17/32 in. round hole ; $\frac{1}{2}$ in. square requires 23/32 in. round hole.



In the case of the $\frac{1}{2}$ in. square shanks, the hole required is approaching $\frac{3}{4}$ in. dia. and 45/64 in. would give a closer fit, provided the corners of the tools are given a light touch on the grinding wheel. If a circular hole is decided upon, it may be advisable to lengthen the block slightly so as to retain a wall and "floor" thickness of about $\frac{1}{8}$ in.

The hole and saw-cut opposite the elevating-screw is for the purpose of giving greater springiness to the split sides of the block, as otherwise considerable force would be required to close the block on to the pillar. The pillar is a piece of B.D.M.S. 1 in. dia. and $1\frac{3}{4}$ in. long bored to take the existing tool clamp holding-down bolt.

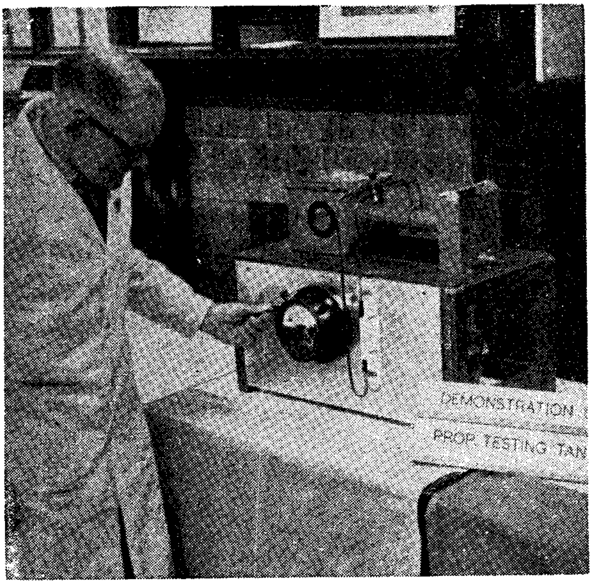
A Propeller Testing Tank

As Used by the North London Society of Model Engineers

by L. V. Raxworthy

THE question of the efficiency of model boat propellers is a very big one, and one which mainly has been by-passed or neglected altogether by model boat builders, the trial and error method being used. What an advantage to test one's propeller before fitting it to a boat, and so be sure instead of "hopeful" of its performance!

It is with this idea in view that this testing tank was started, the basic idea being to design something simple, easy to make, but giving positive readings which could be interpreted in terms of thrust.



The author demonstrating the tank at an exhibition

How it Works

The principle of this device is that of a flow meter, as seen in the diagram; the propeller is mounted in the main tank and driven by an electric motor. As it revolves, a column of water is driven through a tube which is $1\frac{1}{2}$ in. in diameter, in the middle of which is a restricting plate with a $\frac{3}{4}$-in. hole in the centre, which causes the water to flow through in the form of a venturi; this in turn causes a differential pressure on either side of the plate. Two $\frac{1}{8}$-in. bore pipes are fitted into the large tube, one either side of the plate, and leading to a U-tube manometer, in which is a quantity of thin oil (we use 3 in 1 oil). It will be seen that when the propeller is driving the water tthrough the large tube the difference will upset the levels of the oil in the U-tube, and the difference of level will be a direct measure of the thrust of the propeller under test.

There is also an ammeter provided which reads 0-2 amps in steps of 0-1 amps which records the current the motor is taking to drive the propeller under test. The difference in level in the manometer is measured in millimetres; therefore, the efficiency of the propeller will be the rise in level in millimetres divided by the amps.

It will be seen, therefore, that if two propellers under test give the same rise in the manometer, but one takes more amps to drive it, the other propeller will be more efficient. When it comes to a twin-propeller boat, the tank is especially useful, as in this case the two propellers must have equal thrust, otherwise the boat will drift.

As the motor is reversible, it is a simple matter to test both right and left-hand propellers, for it is essential that the direction of rotation of the propeller under test is such that the water is driven from the main tank towards the return tank.

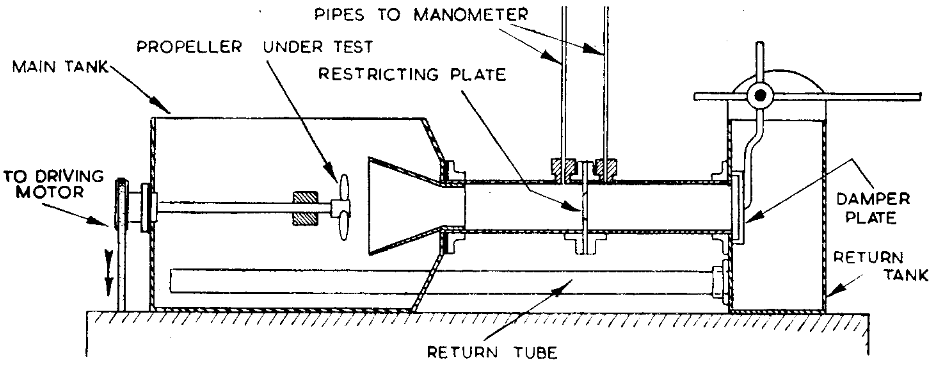
From the return tank there are two 1 in. diameter tubes which lead the water back to the main tank; these are taken back to the far end of the tank, past the propeller, so that the returning water will not interfere with the propeller in any way which may cause a false reading thrust.

The motor is wired to a bank of resistances providing four speeds in either direction; originally, we used a two-cone V-pulley and leather belt for driving. On finding that we were troubled with belt slip, which upset our readings, we changed over to chain drive.

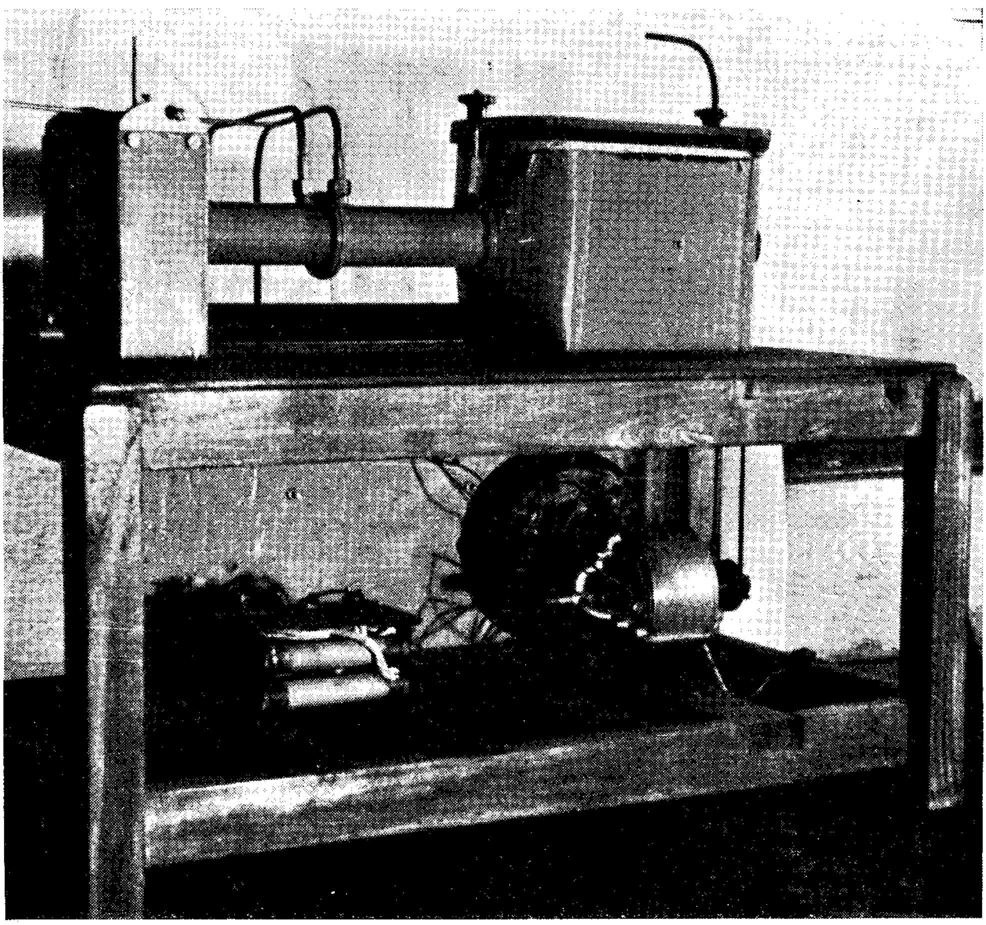
To Stop Splashing

To prevent the water getting splashed all over the place, a Perspex cover has been fitted over the main tank, with a rubber gasket cemented to it with Bostick, and held in position with thumbscrews; the cover is slotted to clear the screws (which are fixed to the tank) the slots allowing for quick removal when changing the propellers under test.

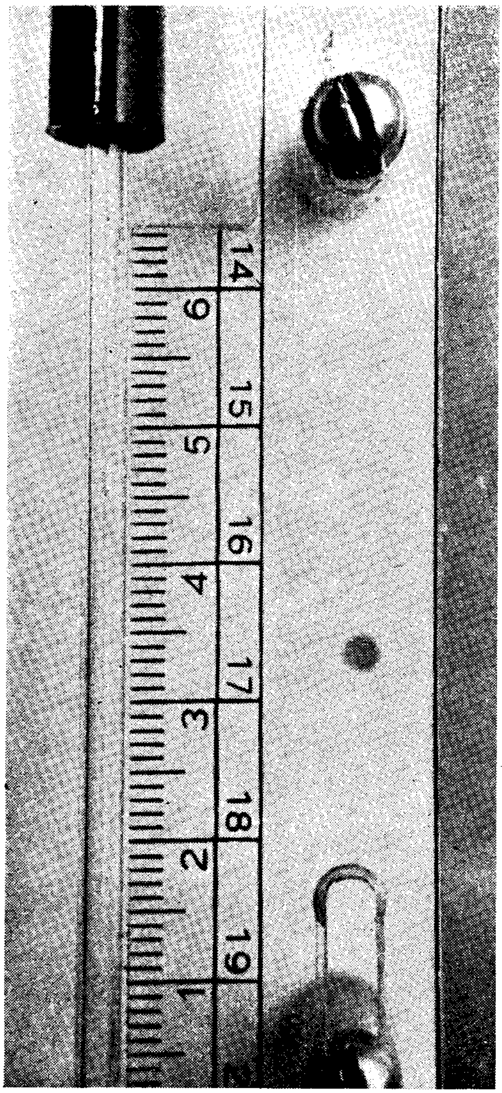
When the tank was first tested, it was found that



Section on vertical centre-line of the propeller testing tank



Back view of tank, showing motor and resistance bank



Close-up of manometer scale

water in the return tank would rise in level when the propeller was started up, and as the water must cover the propeller, some of the water was lost over the side. It was then decided to fit a damper plate over the end of the flow tube; this is so designed as to form an extra device for measuring the thrust, either by using the extension arm as a pointer over a scale, or by attaching it to a spring balance giving a direct reading, or by using a movable known weight and moving it along a series of notches until it balances the force of the flowing water. By making a simple calculation from the centre of movement of the damper plate to the distance of the weight from the fulcrum arm, a measure of thrust can be arrived at.

In addition to being a means of measurement, the damper plate cured the trouble of the rise in level and consequent loss of water.

The fulcrum arm, which carries the damper plate, is swung between centres and screwed into two plates which are screwed to the ends of the return tank, and is adjusted so that it turns freely, but with no side play.

The propeller to be tested is required to be fitted with a shaft, $\frac{1}{2}$ in. of which must project; this portion to be $\frac{3}{16}$ in. diameter. This is fitted to a collett on the end of the driving shaft in the main tank, the other end of which carries the driving sprocket.

An inspection window of Perspex is fitted in the main tank to enable the propeller to be observed while under test. It will be seen from the diagram that where the flow tube joins the main tank, the side of the tank is bowed to prevent eddies and undue turbulence.

From the first, the tank has proved invaluable as a means of measuring the efficiency of boat propellers, and has justified the thought and effort spent in its making. In the early days of its inception, there were many doubts and doubters as to whether it would work, but as it turned out, the original theory has been amply proved in practice and I can recommend any club whose members want to make boats to set about making a testing tank on these or similar lines, and I should be only too pleased to answer any queries, through the good offices of THE MODEL ENGINEER, and also to receive any suggestions or criticisms which may arise from this article.

The photographs reproduced with this article are by courtesy of the N.L.S.M.E. "News Sheet."

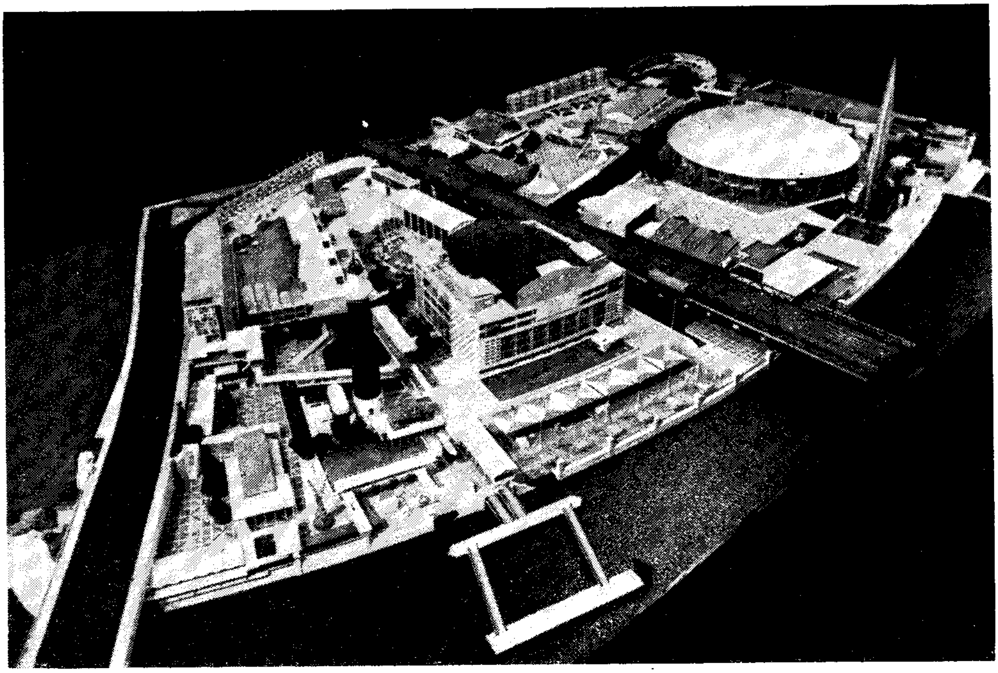
Protection Against Rust

We have recently received from Messrs. E. R. Howard Ltd., 3-in-One Works, Stowmarket, Suffolk, a very interesting leaflet entitled "Complete Protection Against Rust," which gives results of the recent laboratory examination to establish the rust inhibitive properties of 3-in-One Oil, compared with various contemporary products.

A copy of the leaflet may be obtained on application to the manufacturers.

THE SOUTH BANK IN MINIATURE

A Beautiful Example of Modelcraft, made in a Brighton Garage



A VERY complete model of the Festival of Britain Exhibition on the South Bank of the Thames, London, has recently been completed by two Brighton model-makers after five thousand hours of strenuous work.

The model which stands on a base 6 ft. × 3 ft. 6 in. is very complete in every detail and compares more than favourably with the official model that has been on exhibition in the basement of Messrs. Swan & Edgars premises in Piccadilly, London.

The colouring of the various pavilions with their somewhat bizarre schemes of decoration has been more faithfully carried out than in the official model, and all the intricate girder supports of the Dome of Discovery, the Sea Pavilion and all the work of the Bailey Bridge spanning the Thames have been made in metal. This has necessitated making thousands of tiny solder joints, so well finished that they faithfully show an exact replica of the full-sized structures. Every item of the model has been painstakingly made by hand and all sorts of wood, metal, plastics and card have been used for the work, so that the model in every particular is true to the scale of 1/328. The builders are Messrs. R. C. French and D. W. Hefford, the former 23 and the latter 25 years of age, and both residents of the big popular seaside resort. The total cost of the model to build has been estimated at just under £500, but this does not include the full cost of time-wages if the builders had been paid at normal rates, their re-imbursement will, it is hoped, come later, as the builders are directors of Modelmakers (Brighton) Ltd., and it is arranged that the model will make a tour of the country and will be shown at various industrial exhibitions in England, viz : the Potteries (Newcastle-under-Lyme), Burnley, Wakefield, Peterborough, Mansfield, Ipswich, Southend-on-Sea, etc.

The whole model was made in an ordinary lock-up car garage used as a workshop.

—G. H. Davis.

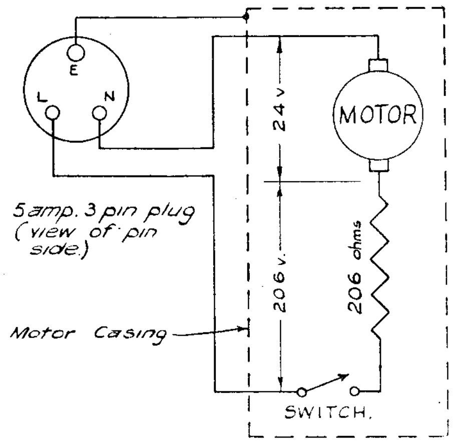


Fig. 1. *Circuit diagram of drier. It is essential for the resistance and switch to be connected in the live lead*

A Hair Drier

Adapting a Surplus Blower Unit

by J. Stebbings

WE have recently, in the pages of THE MODEL ENGINEER, had some articles and correspondence dealing with making equipment for domestic use ; and, although such work can hardly be classified as model engineering, the author agrees with previous writers that it is in the interest of model engineers generally that this sideline to our hobby should be kept in mind. Indeed, the author knows of one model engineer whose continued occupation of part of the kitchen as a workshop is only maintained by the periodic diversion of his activities to the domestic sphere. Such work has to be undertaken whenever a notice to quit has been served by high authority, as happens at intervals !

No excuse, therefore, is offered for the following description of the construction of a domestic hair drier, which, it is hoped, will be of interest to model engineers in need of ideas for producing something "useful" in order to justify their activities.

The basis of the machine is a blower motor assembly for U.S. Navy aircraft radar equipment, model AN/APS-2D or 2E. It consists of a 24 V series-wound motor taking 1 A, to which is attached a centrifugal blower unit. The motor is intended for operation on d.c., but, having a laminated field, it runs well on a.c. It is a beautiful piece of work having ball-bearings and radio interference suppression condensers.

Voltage Drop

It was necessary for the machine to operate from a 230 V, a.c. supply and the required voltage drop was secured by the inclusion of a series resistance. The heat dissipated in this resistance, which is mounted in the nozzle of the unit, is sufficient to heat the air from the blower. This may seem a simple way of operating a low voltage motor from the normal mains supply, but as the insulation in the motor is not intended to withstand high voltages, certain precautions are necessary for the safety of the motor and more particularly of the operator. Therefore, before

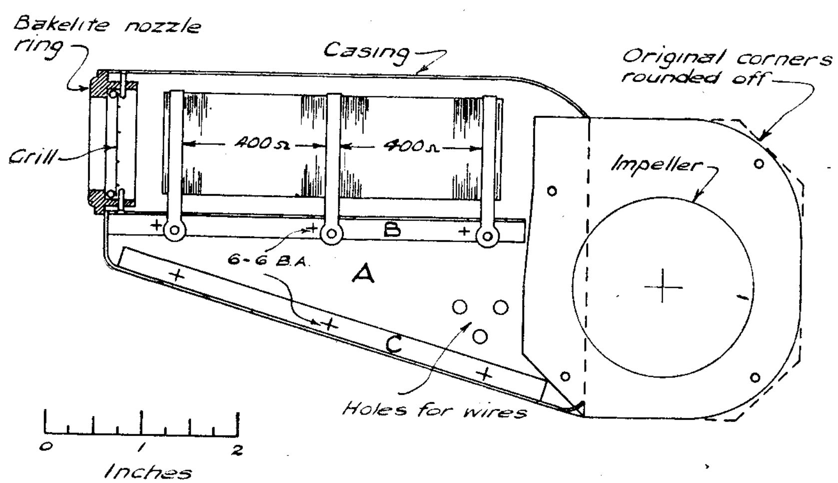


Fig. 2. *Section through nozzle assembly*

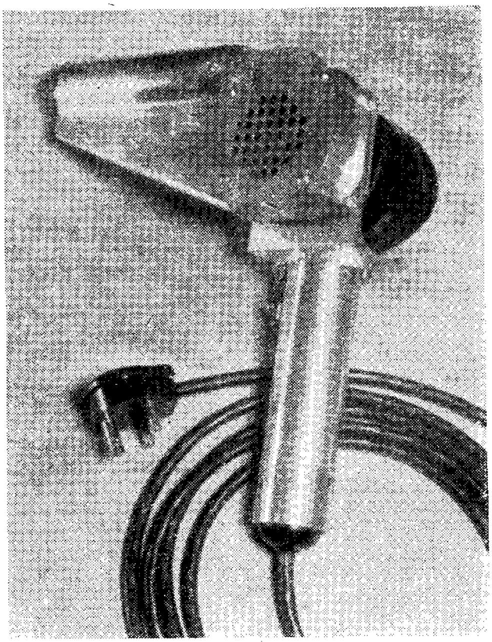


Fig. 3. *The completed drier, showing the nozzle added to the original blower*

going into details of the construction, the method of wiring will be discussed. It is essential that the machine be connected to a 3-wire supply by means of a 3-pin plug, so that the casing can be properly earthed. Model engineers who may be making a similar machine or working other low-voltage motors from the mains are warned against varying the method of wiring, and in particular against using a lamp holder as a supply point.

The Circuit

Fig. 1 shows the circuit, and it will be seen that the voltage-dropping resistance and switch are wired in the live lead. The neutral lead is, of course, more or less at earth potential, and as this goes direct to the motor, the voltage existing between any part of the motor and its casing cannot ever be much above normal. As the casing is earthed, any insulation failure will result in a blown fuse instead of the casing becoming alive with resultant danger to the operator.

The resistance used is a radio type known as a " mains dropper " for use in Universal a.c./d.c. sets. Its rating is 800 ohms 0.3 A. It consists of a ceramic former on which is wound the resistance wire. The end terminals consist of brass clips, and there is also another clip between them as a tapping point, the position of which may be varied. This tapping point was set at the electrical mid point by the use of an ohmmeter. The two halves of 400 ohms each were then connected in parallel to give an effective resistance of 200 ohms, as shown in Figs. 2 and 6. Thus connected, the resistance would be rated for a maximum current of 0.6 A, but as the heat is rapidly carried away by the blast, it will pass the motor current without ill-effect.

Figs. 3 and 4 show the completed machine, and it will be seen that additional parts added to the original blower assembly are a sheet metal nozzle to contain the heating resistance, and an angle bracket attached to the motor for the purpose of securing the flanged handle.

The motor, although only $2\frac{3}{4}$ in. diameter by $2\frac{3}{4}$ in. long, is quite heavy. It was, therefore, decided that all the new parts would be made of aluminium.

The Nozzle

To deal first with the nozzle, it will be seen from Fig. 2 that it consists of three pieces of 22-s.w.g. aluminium. *A* is bent to form the two sides and circular top, *B* is a tray forming the bottom of the air duct and having holes cut for the resistance terminals, and *C* is a second tray closing the bottom edge of the nozzle. In the space between *B* and *C* the wiring connections are made. Part *A* was bent to give $\frac{3}{16}$ in. clearance around the resistance, the mounting of which requires some explanation, and is shown in Fig. 5.

The Resistance

As bought, the resistance was fitted with a through bolt and sheet-metal cups fitting into the ends of the former. The bolt holes in the cups were enlarged to allow air to pass through

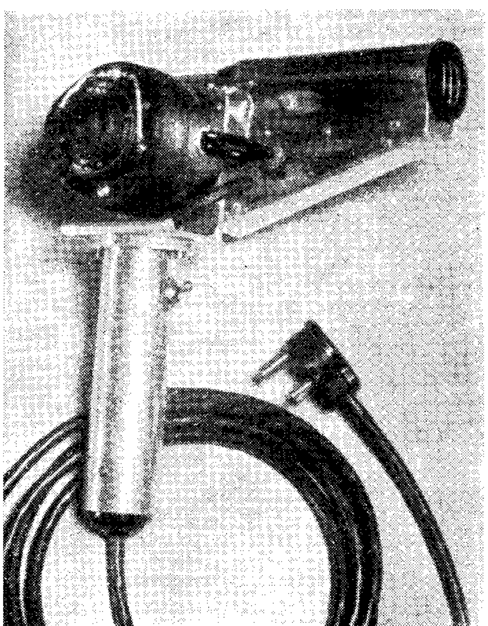


Fig. 4. *View showing the original motor and method of attaching new handle*

inside the former, and two sheet-metal brackets were brazed to each cup for the attachment to the casing with 6-B.A. nuts and bolts. Fortunately, the cups were a force fit in the former, as it is essential that it should be prevented turning, which would allow the terminals to short on to the metal tray *B*. The original through bolt, of course, was not used.

The nozzle ring was made by drilling a large hole in a 5-A plug top which happened to be the right diameter. This was secured to the casing

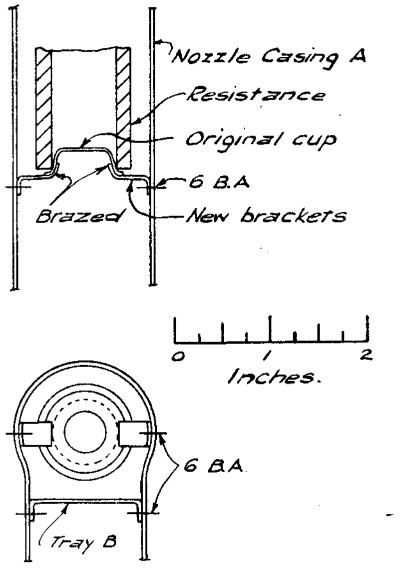


Fig. 5. Method of fixing resistance to nozzle casing

A by 6-B.A. screws at the top and bottom tapped into the bakelite. It should be noted that these screws project far enough inside to prevent backward movement of the wire grill. The grill is a tight fit inside the nozzle ring and is made up of a ring of 12-s.w.g. iron wire to which is soldered cross-wire of 22-s.w.g. tinned copper.

From the Scrap-box

The handle is attached to the motor by an aluminium bracket made from 2 in. × 2 in. × 1/8 in. angle, with one leg cut down to 1 5/16 in. The photographs show that it is a bulb angle, but this is not essential. Like most model engineers, the author must, by reasons of economy or difficulties of supply, use materials found in the junk-box. In this connection it might be of interest to mention that it was difficult to find a piece of 1/4 in. thick aluminium for the handle flange. However, this was eventually made from the sawn-off top of a pedestrian-crossing stud. The author hastens to point out, however, that this was obtained quite legally, and model engineers should be definitely discouraged from rushing out to the nearest road junction as a convenient source of supply!

The handle itself is 1 1/2 in. diameter tube 5/64 in. thick, which is large enough to allow the insertion of a radio type toggle switch. The end cap was made by turning the top of a lamp holder to fit inside the tube. It was secured by three 7-B.A. countersunk screws tapped into the bakelite holder.

Wiring

Fig. 6 shows the method of wiring, which is facilitated by the inclusion of 2-way and 3-way connectors. Care is necessary in the selection of these connectors because it is essential that the screw-heads should be sufficiently recessed *after insertion of the wires* to prevent accidental contact with the metal work. Any doubt on this point can be dispelled by binding the connectors with insulating tape. The three leads terminating at the resistance, and, therefore, subject to heat by conduction, are made with 22-s.w.g. tinned copper wire insulated by glass-fibre sleeving. The original motor leads are further protected by ordinary varnished sleeving pushed well into the motor housing, and all leads passing through holes in metal are protected by rubber grommets.

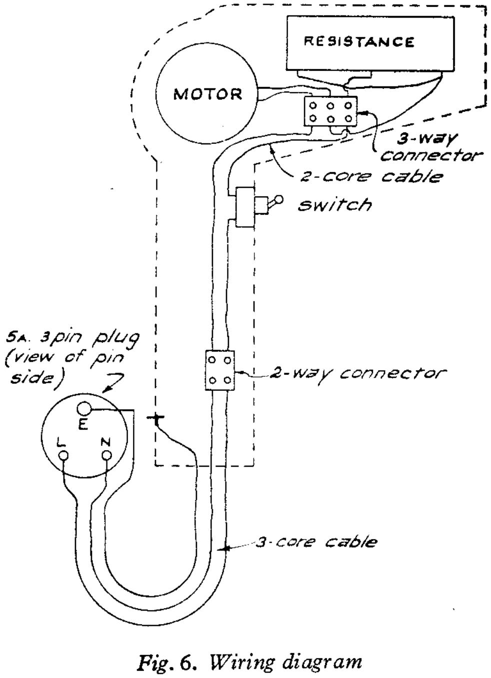


Fig. 6. Wiring diagram

One further point of importance: the blower casing is spaced from the motor end-plate by 3/8 in. and within this gap the motor spindle is exposed. A sheet-metal guard was fixed around the spindle to prevent the possible entanglement of long hair.

IN THE WORKSHOP

by "Duplex"

No. 90—A Die-Holder with Detachable Guides

IT is interesting to look back on the past and see how the methods of forming screw threads with the aid of dies have advanced.

Earliest recollections are of a solid, single-handled die-plate drilled and tapped with a range of thread sizes. This was not an easy tool to handle, as, when using the die-holes at one end, nearly all the weight was at the other. Corresponding taps were made with the die-plate itself and then filed square before hardening.

This difficulty of keeping the die square with the work was overcome when a die-holder was bought that was fitted with paired, rectangular die-blocks sliding in a frame furnished with a closing screw. Here, the manufacturers included a set of four-sided taps to fit the four dies supplied with the frame. Whereas the solid die-plate, perforce, cut the thread at a single passage over the work, the split dies needed much up and down work, with cautious tightening of the feed screw, if the threads were not to be torn off when nearly finished. The divided dies, nevertheless, had the advantage that they could with certainty be closed squarely on the work, so that the thread formed, such as it was, also stood squarely. The two-handled die stocks, carrying a single pair of dies, that followed were little better at rolling and tearing a thread on the work. The next advance was the purchase of a set of Pratt & Whitney screwing tackle. Each circular die was carried in a collet mounting, where it was held in place by the adjusting screws ; in addition, a set of fluted plug and taper taps was included. A difficulty arose, however, when threading the end of a shouldered shaft, for this meant that the die itself had to be transferred to another guide collet of the right size to fit the full diameter of the shaft. Finally, since the day, more than 35 years ago, when a set of Card dies, complete with die holder and interchangeable guide collets, was bought, screw threading has had few difficulties. This set of screwing tackle is still up to date and will cut threads squarely at a single passage over the work.

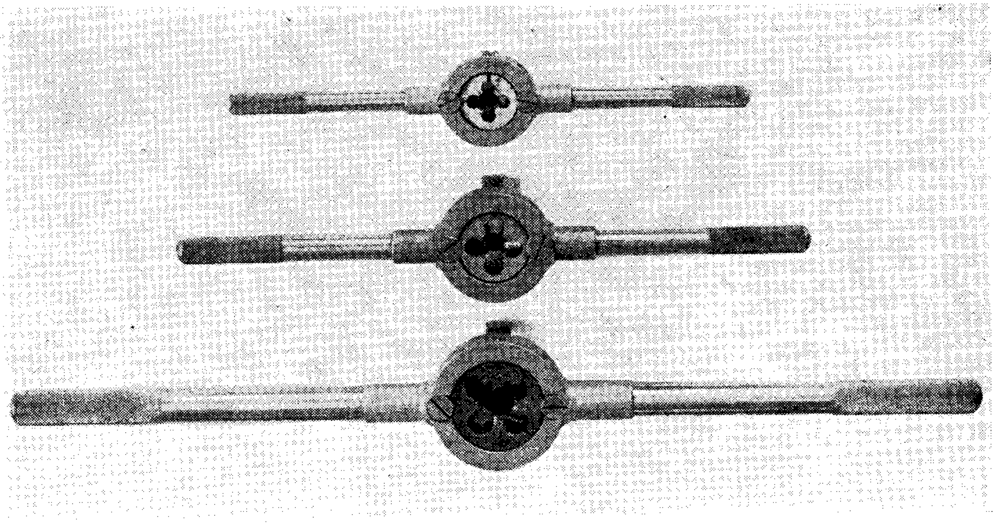


Fig. 1. The die-holder made in three sizes

For some reason that would be difficult to explain, colleted die-holders of this kind have been unobtainable in this country for many years past, but it is unlikely that those who have used these die-holders would willingly revert to the more primitive form. Thinking that others were, perhaps, more skilful than ourselves in using dies, we asked a number of workers, both amateur and professional, how they made sure of threading work squarely without the aid of a guide collet ; the invariable answer was that there was no certainty in the matter and that it was largely a matter of luck whether a true or a drunken thread was formed. Most of those questioned said that, whenever possible, they used a die-holder in the lathe to obtain satisfactory

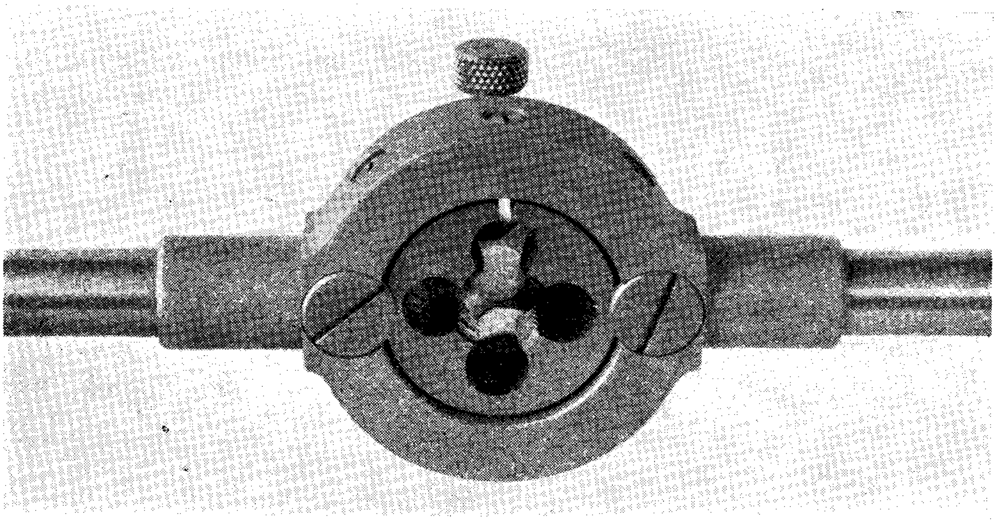


Fig. 2. Showing the screws for fixing and clamping the die

threading. However, with proper equipment, there is no need to go to the trouble of threading awkward pieces of work in the lathe.

Some years ago, a die-holder was made for use in the lathe tailstock, and in this several modifications of the original Card design were incorporated. A pressure plate was fitted over the die and was held down with two screws ; this arrangement enabled the die to be kept squarely in place even when the stop-screw securing the die was not exactly at the right level.

Moreover, for some purposes, a parallel form of guide collet was found to be preferable to the shouldered pattern.

In designing a die-holder, some little difficulty was experienced in deciding what was the best form of screw fixing to keep the die from turning in the housing machined in the holder. Examination of a large number of circular dies of many different makes showed that both the form and the position of the fixing slots varied greatly, and that a universal type of mounting would not be easy to arrange. Nevertheless, by using a clamping plate or clamping screws, the more popular makes of dies can be accommodated.

After some trials had been made and the die-holder had been thoroughly tested, the pattern illustrated in Fig. 1 was adopted.

Here, instead of a clamping plate, two screws are fitted to hold the die level and keep it from

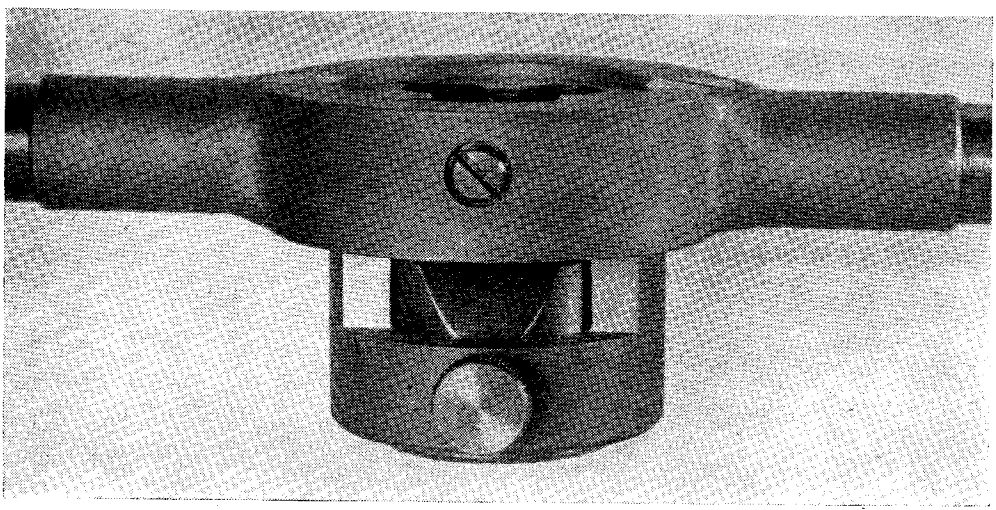


Fig. 3. The die and guide collet in position in the holder

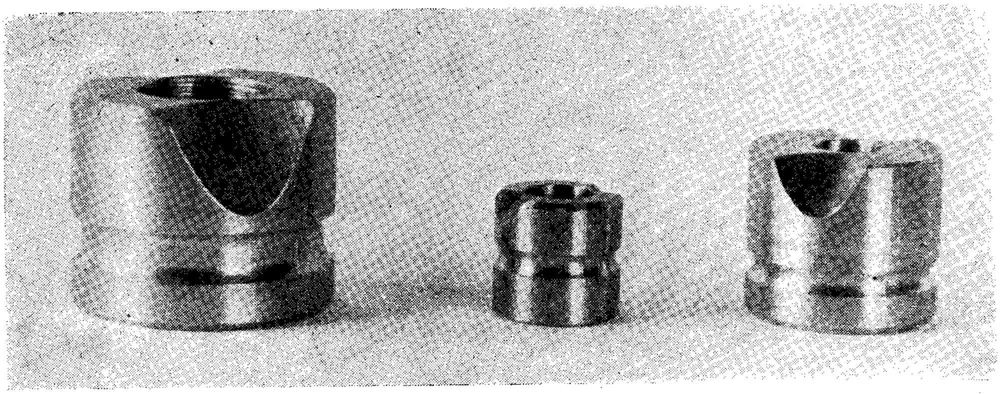


Fig. 4. The three sizes of guide collets

rising in the holder under the pressure applied when starting a thread. To change the die, these screws must be removed and, with this in mind, the threaded portion of the screw has been kept short. In addition, both the head and the parallel part of the screw below the head are made a close fit in the body of the holder; this is done so as to resist the tendency for the screw to tip as it is tightened, and also to save the screws from side strain.

The body portion of the die-holder was machined from a bronze casting supplied by Mr. H. Haselgrove; malleable iron would, no doubt, be stronger and cheaper, but castings of this material are less easily obtained except in rather larger quantities. As will be seen, guide collets of parallel form have been fitted; these reduce the distance between the lower end of the collet and the lower surface of the die, and, to reduce this distance still further, a shorter collet that

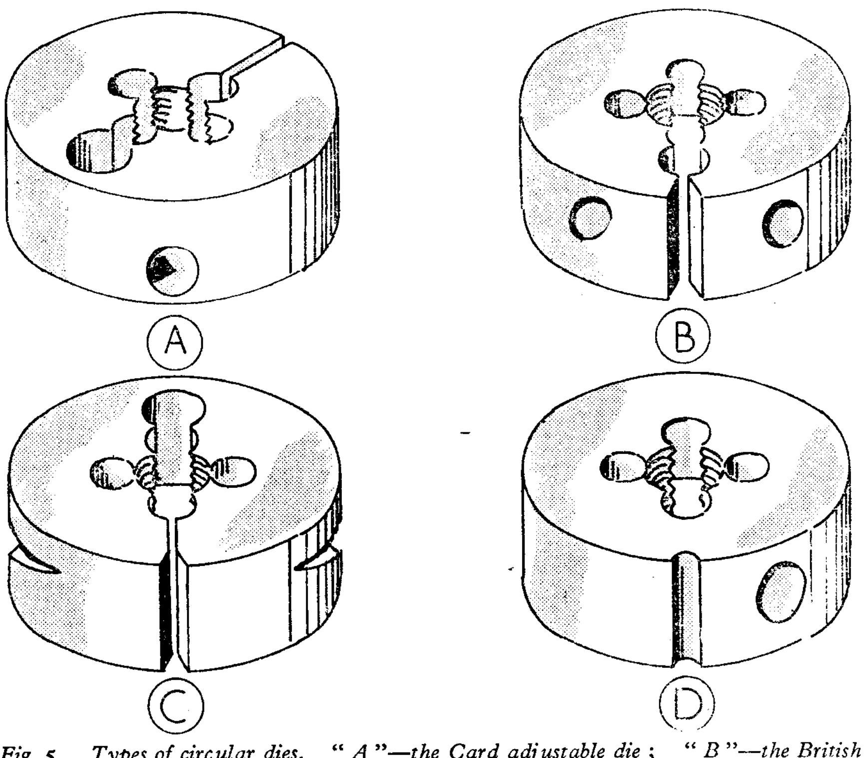


Fig. 5. Types of circular dies. "A"—the Card adjustable die; "B"—the British pattern plain, split die; "C"—the Pratt & Whitney and the Warrior die with fixing grooves at side; "D"—a solid die

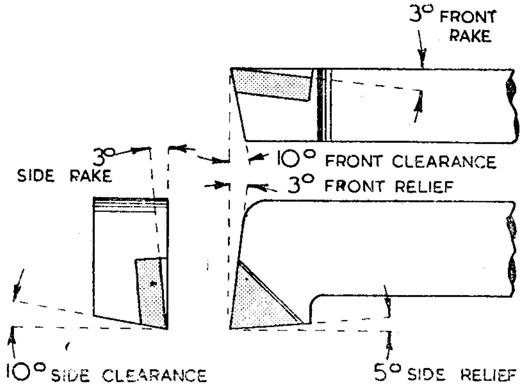


Fig. 6. A tungsten carbide-tipped tool suitable for machining bronze

can slide upwards in the housing can be used.

Owing to the great variety of the positions of the fixing slots in different makes of circular dies the holes for the fixing screws should be positioned to serve the particular dies used ; but, as there is ample space on either side of the body, additional screws can be fitted, if required, for more than one pattern of die.

Fixing Screws

As the Card die is made with a fixing dimple above the centre-line of the die, it is advisable to fit two fixing-screws, one above and one below the centre of the housing ; this will allow the die to be reversed in the holder, as may often be found necessary. Dies of the Pratt & Whitney and the Warrior make have two grooved slots formed at an interval of 180 deg. on the centre line of the die, and when two fixing-screws are fitted to correspond, the die can be reversed at will. To afford a fixing, some British circular dies rely on the slot formed when the die is split ; but in addition to the single fixing-screw then used, two more screws will be required to keep the die from expanding when in operation. The adjustment of the die to set the size of thread cut is then dependent on the relative tightness of these two sets of screws. For this reason, dies fitted with a self-contained adjusting screw or wedge may be preferred, as this pattern cannot be further closed by the pressure of the fixing-screws, and these now serve to keep the die from expanding when cutting a thread. The solid, unsplit form of circular die has many advantages and, as they are usually of the best quality and are very accurately made, there will be no need for making any adjustment even after prolonged use.

One make of these dies has a single vertical slot for engagement with the fixing-screw, and if the die-holder is fitted with two clamping screws, the die will then be securely held and accurately aligned. Unfortunately, circular dies are sometimes found with the threaded bore formed eccentrically, or, again, the bore may not be square with the faces of the die ; such dies are better discarded, as it is hardly worthwhile trying to correct the errors by using packings. If the truth of a die is in doubt, the die should be tested by screwing it on to a piece of accurately threaded rod held truly in the lathe chuck.

On turning the lathe mandrel, while the test indicator is applied first to the periphery of the die and then, in turn, to the two side faces, any inaccuracy in the alignment of the bore will be revealed.

Full Range of Threading

The die-holders illustrated have been made to take circular dies of the four sizes most commonly used, namely, those having diameters of $\frac{13}{16}$ in., 1 in., $1\frac{5}{16}$ in., and $1\frac{1}{2}$ in. However, two die-holders for $\frac{13}{16}$ in. and $1\frac{5}{16}$ in. diameter dies will cover the full range of threading generally required ; for a $\frac{13}{16}$ in. die will cut threads from those of the smallest diameter up to $\frac{1}{4}$ in. or $\frac{5}{16}$ in., and the $1\frac{5}{16}$ in. size is made for threading work of from $\frac{3}{16}$ in. to $\frac{9}{16}$ in. diameter.

Nevertheless, as circular dies of 1 in. diameter are in common use, the dimensions of a holder of this size are included in the working drawings. If a number of circular dies of different makes are measured with a micrometer, the outside diameters will be found to vary by several thousandths of an inch ; when, therefore, machining the die housing to size, this dimension must be made large enough to accommodate the largest die of the series.

Some split dies were, in fact, found to exceed the nominal diameter of 0.8125 in. by as much as five thousandths of an inch, although the solid dies, previously referred to, all measured exactly 0.8120 in. and would, therefore, fit accurately in a die-holder machined to the standard measurement.

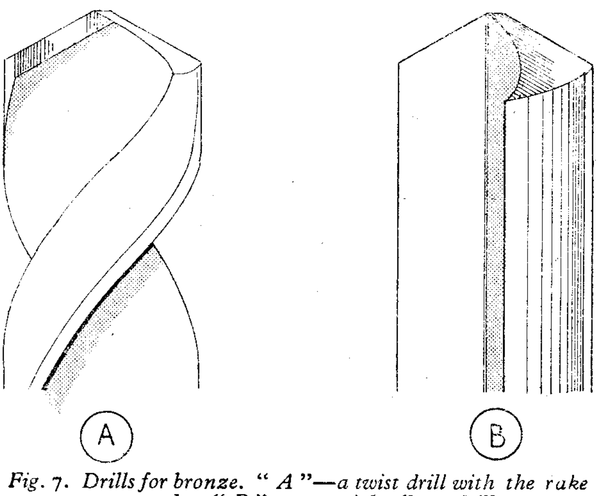


Fig. 7. Drills for bronze. " A "—a twist drill with the rake removed ; " B "—a straight-flute drill

The split type of die usually tends to spring shut so as to close on the work, and the adjusting screw is then designed to force the die open. When adjusting a die of this kind, it may be found that the spring in the die makes the adjusting screw difficult to turn. If this is so, the die should be expanded to allow the screw to turn freely, but care must be taken to avoid using any haphazard method of expansion that might break the die. A useful way of expanding the die is to press a tapered centre-punch into the swarf clearance hole adjacent to the adjusting screw ; this takes the pressure off the threads and the adjusting screw can then readily be set exactly as required.

Machining the Casting

Although ordinary high-speed steel tools will serve well for machining the bronze body of the die-holder, time will be saved and, possibly, a better finish will be obtained if a tungsten carbide-tipped tool is used. As is now well known, these tools are but little affected by any scale or sand grains remaining on the surface of the casting. When turning bronze, a Wimet tool of N. Grade will be found suitable, but to avoid any tendency for the tool to dig-in, the rake angle should be restricted to some five deg. ; however, for machining some of the harder bronzes, a tool formed with a negative rake will sometimes give a better finish to the work.

As bronze can be turned with tungsten carbide tools at work speeds up to 1,000 surface ft. per minute, the highest, direct mandrel speed can be employed in order to reduce the time taken in machining. Although different bronze alloys vary greatly in their machinability, an ordinary twist drill will, as a rule, tend to dig-in and catch up in the work ; this is because of the rake formed at the cutting edges of the drill point.

Straight-flute drills, manufactured by the Morse Drill Co., of the U.S.A., are most useful for drilling non-ferrous metals, as they do not tend to dig-in, nor do they catch in the work when the drill point breaks through. For machining soft metals, drills of the Dormer brand are manufactured with a more open angle of twist ; this greatly lessens the amount of rake given to the cutting lips and so reduces the danger of digging-in.

An ordinary twist drill can, however, quite easily be made suitable for drilling bronze and similar metals by stoning the cutting lips to remove the rake, as represented in Fig. 7.

If the two small flats formed in this way do not exceed some 10 thousandths of an inch in width, the drill point can, at any time, be restored to its original form with the aid of a drill grinding jig.

(To be continued)

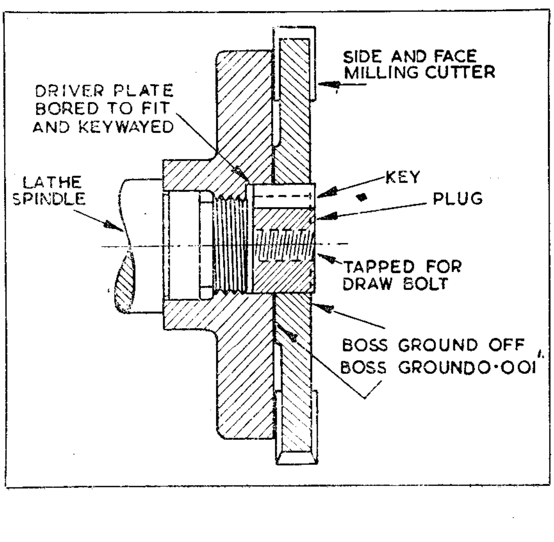
Heavy Face-Milling with a Lathe

by R. B. T. Hall-Craggs

THE sketch shows a side-and-face milling cutter mounted on the driver-plate of a lathe.

The writer uses this set-up on a $3\frac{1}{2}$-in. lathe, sometimes in conjunction with a special cross-slide 20 in. long with 15 in. travel, to machine large flat surfaces. The stiff and accurate mounting allows heavy cuts to be taken, and a good finish is obtained.

The right-hand boss of the cutter is ground away so that the plug with its small shoulder (about 1/32 in. by 1/32 in. is enough) lies just clear of the work as it travels across the centre of the cutter. The grinding need not be accurate and an ordinary tool grinder could be used with the cutter held firmly in the hand.



The left-hand boss is ground away just enough to be sure that the left-hand edges of the cutter teeth are supported by the face of the driver plate.

The plug is a "nice" fit in the two bores, without forcing, and the key is dovetailed to it. The blind keyway in the driver-plate is made by drilling two holes and chipping out square.

The face of the driver-plate has to be skimmed up while the plate is in place on the mandrel nose, if it does not already run dead true.

The draw-bolt is a length of $\frac{5}{16}$-in. bar passing through the hollow mandrel to a nut at the left-hand end.

A UNIVERSAL DRILL JIG

by "Base Circle"

AS a rule it is not worth while to spend time making special jigs or fixtures for the ordinary run of work tackled by readers of THE MODEL ENGINEER. Generally there are not more than two parts of each kind, at the most, to be we make a good job of the square, and then! —yes, then the trouble begins—we drill the cross-hole just a little bit off centre, just enough to make the whole job an eyesore to the maker ever after.

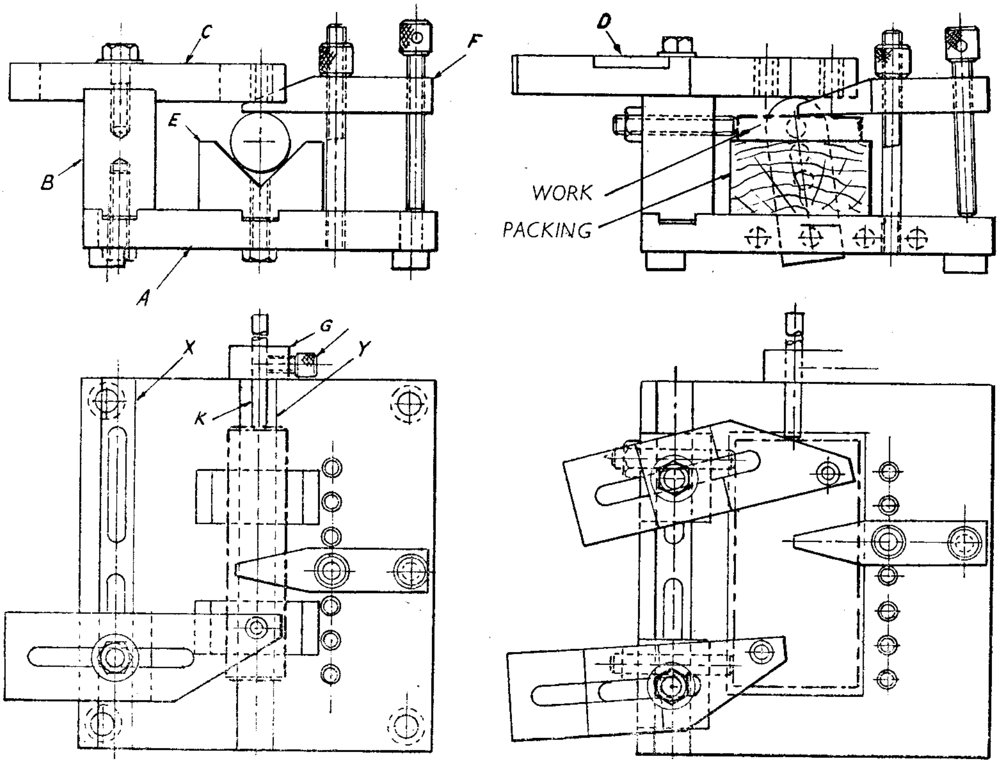


Fig. 1. Left—Jig set up for drilling pins, shafts etc. Right—Jig set up for drilling plates, etc.

made, and usually it would take longer to make the jigs than to make the parts without the jigs. There are, however, some operations which a jig makes much easier, and if a jig can be made which can be adapted to carry out such operations on a variety of parts, then it becomes well worth while to make it.

One such operation is the drilling of cross-holes in pins and spindles. Without proper equipment, this can be quite an exasperating proceeding, as most of us know from bitter experience. Even with the greatest care, the results often leave a lot to be desired. Take, for example, a simple job like the making of a chuck key. We carefully turn and polish the body of the key;

It is comparatively easy to design and make a jig which will make the operation of drilling cross-holes in quite a range of work, child's play. In fact, there are jigs for this purpose on the market which are fairly cheap and which will be found to be quite effective.

In the first instance, the design here presented was intended for cross-drilling only, but when roughed out it was seen that, with a little extra work, the jig could be made to cope with a much wider variety of work than the drilling of cross-holes. In fact, it could, within limits, become a sort of universal help in producing holes exactly where required in all shapes and sizes of parts. I have called it a universal drill jig, but,

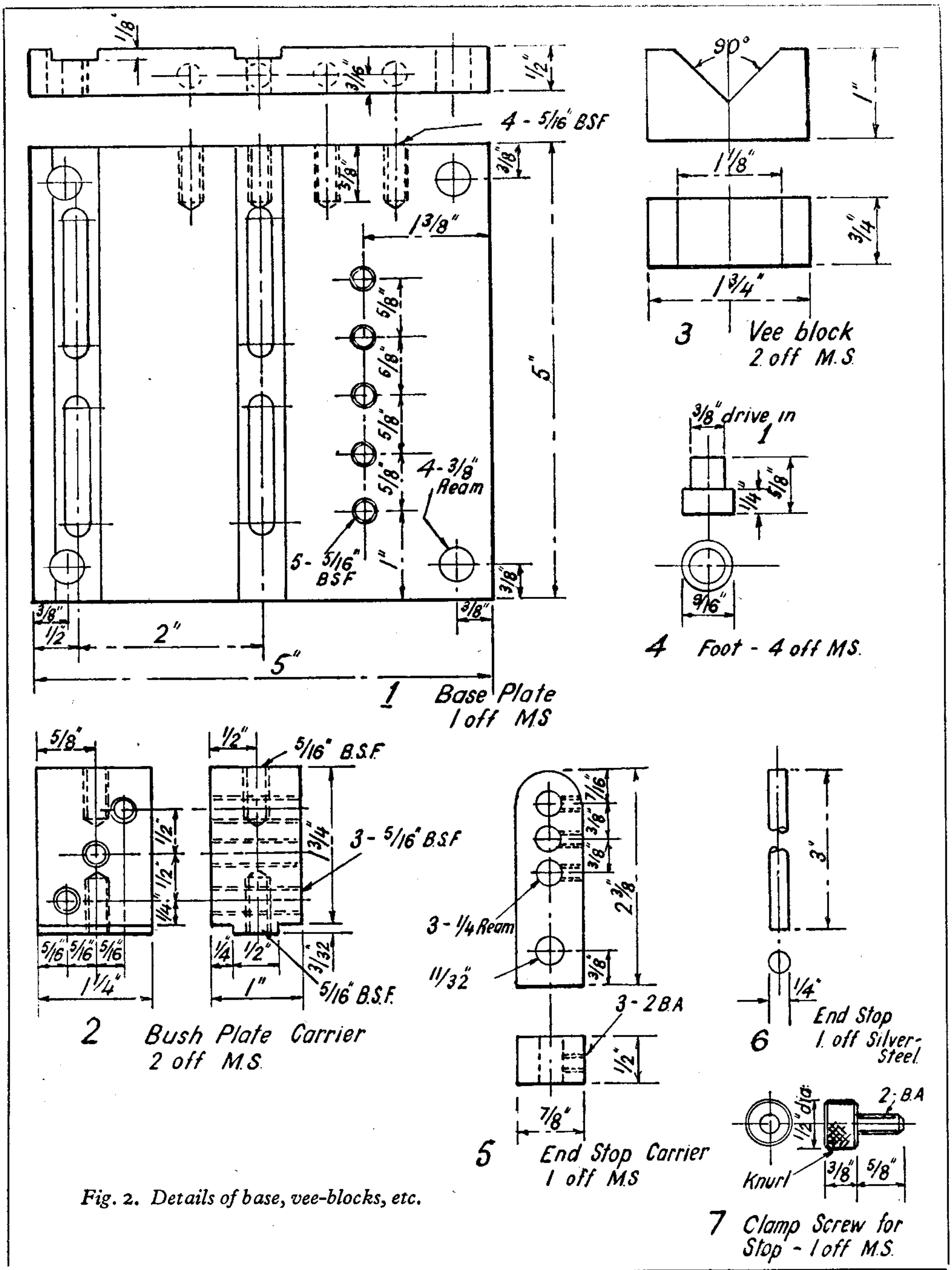


Fig. 2. Details of base, vee-blocks, etc.

of course, that is not strictly true, for no jig can be truly universal. It will, however, be found to be very useful and, once made, it will undoubtedly be in surprisingly frequent use.

Referring to Fig. 1, it will be seen that the jig consists essentially of a plate, base *A*, on which can be mounted various adaptors. The slot *X* locates the blocks *B* which carry bush-plates *C*. These blocks can be located anywhere in the length of the slot and are held in place by $\frac{5}{16}$-in. B.S.F. screws.

It will be seen that the base is supported on

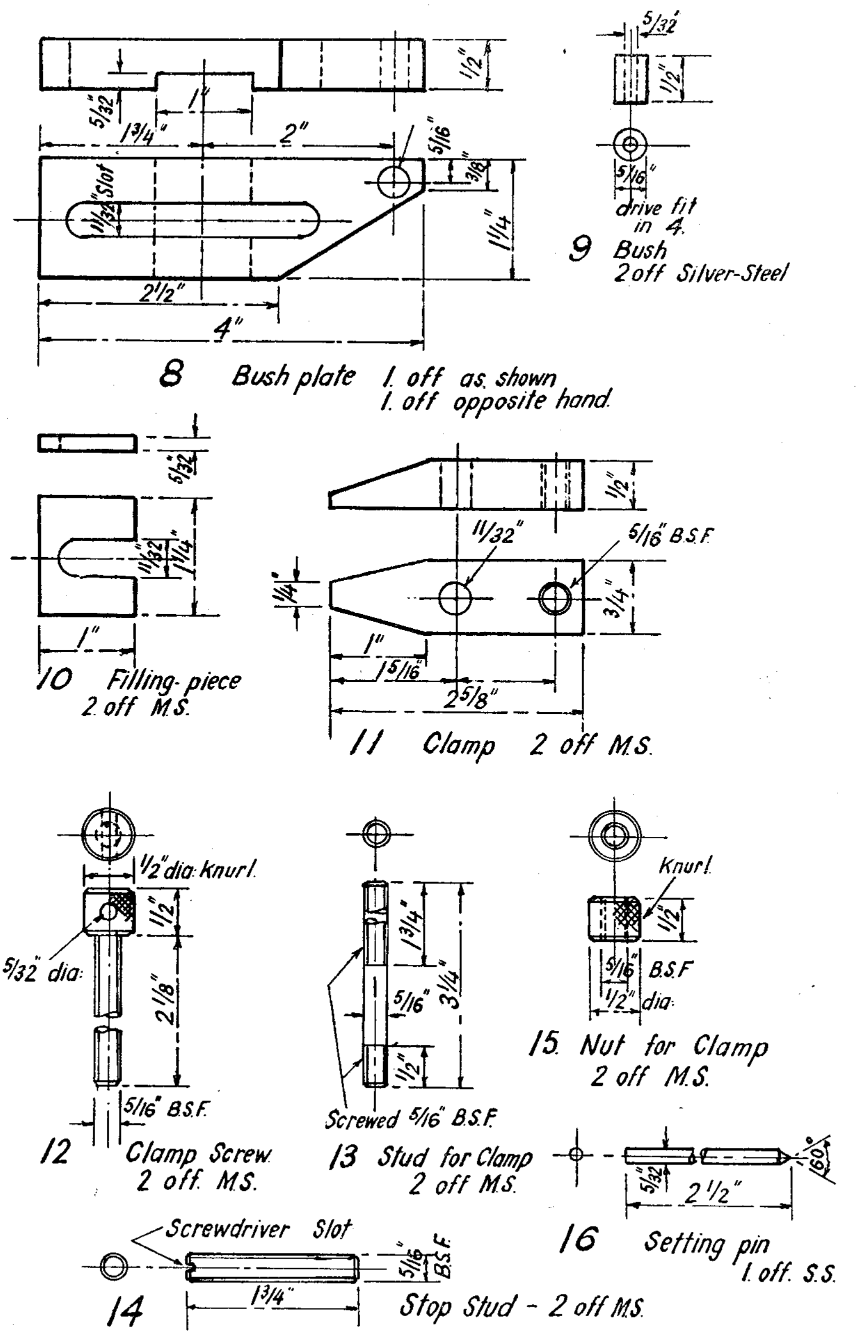


Fig. 3. Details of bush plates, clamps, etc.

four feet to allow for the heads of these screws. The bush-plates can be used either side up. When assembled, as shown on the left in Fig. 1, the jig is suitable for cross-hole drilling, the bush-plate being positively located by the fit of the 1 in. wide slot on the block *B*. When assembled, as on the right in Fig. 1, the bush-plate has universal movement and the drill-bush can be placed where desired. The bush-plates are fastened to the blocks by $\frac{5}{16}$-in. B.S.F. screws. As there would be trouble in clamping the bush-plate when arranged as on the right in Fig. 1, when the clamping-screw happened to come over the 1 in. slot, filling-up pieces 10 (Fig. 2) are provided.

The second slot *Y* in the base serves to locate the vee-blocks *E*, and it will be seen that the dimensions given bring the drill bushes exactly over the centre-line of the vee-blocks. The vee-blocks are clamped to the base in the same way as the bush-plate blocks *B*.

It is now apparent that a pin or spindle located in the vee-blocks can have a hole drilled exactly through the centre-line, or, if both bush-plates are used, two holes can be drilled at any desired distance apart in as many parts as required. The work is held for drilling by means of the clamp *F*. Two clamps are provided, but in many cases one will be sufficient. These clamps can be located in any one of the $\frac{5}{16}$ in. B.S.F. tapped holes shown and, as will be seen, are readily adjustable for height.

A point to be noted is that the bushes are placed close to one side of the bush-plates so that holes can be drilled quite close together. An end stop for the work is shown at *G*. This consists of a block which can be clamped to the baseplate using any one of the series of tapped holes shown. Through the block passes the stop rod *K*, which again can be placed in any one of the series of three $\frac{1}{4}$ in. reamed holes in *G*. The stop-rod is locked in position by the screw *H*.

It is suggested that fixed bushes—say, 5/32 in. bore—be used, but the enthusiast may wish to provide himself with a set of bushes to cover all sizes of drills likely to be used. Actually, for all ordinary purposes, one fixed bush will be found to be perfectly satisfactory. If a smaller hole is desired, it is only necessary to spot the work with the 5/32-in. drill and drill through with the smaller drill. If, on the other hand, a larger hole is required, the 5/32-in. drill is put right through and the hole is opened out to the required size with the bush-plate removed. For very accurate work, it is, of course, much better to use a bush of the correct size for the hole. If it is decided that interchangeable bushes are to be used, they should be made with flanges so that they can be held in by a screw in the usual way.

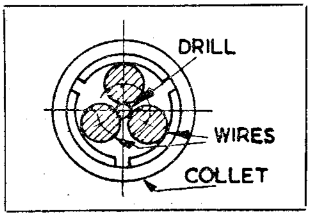
When the jig is to be used for work other than cross-hole drilling, the vee-blocks are removed and the work is clamped down on the baseplate using suitable packing—wood is quite suitable—to prevent the drills damaging the base and to bring the work to a suitable height relative to the bushes. The work can be located against the faces of the blocks *B*, or if the edge of the work is irregular, stop-screws can be inserted in the tapped holes in the blocks and adjusted as required. The end location is the same stop-rod as is used for cross-drilling. The block carrying this rod can be adjusted to suit the work, using whichever tapped hole is most convenient for clamping it to the base and putting the stop-rod in the most suitable of the three reamed holes.

To set the jig to drill several plates, such as are shown on the right in Fig. 1, it is only necessary to mark off one plate. This plate is then clamped in the jig (using the same clamps as for cross-drilling) and the bushes are lined up to the marked-off centres by using the pointed rod (detail 16, Fig. 3) which is a good sliding fit in the bushes. When the bushes are properly set, the point of the rod should coincide exactly with the marked-off centre when it is dropped through each bush in turn. When the jig is satisfactorily adjusted, drilling can proceed with the assurance that all parts will be exactly the same. If more than two holes are required, it is, of course, only necessary to reset the bushes for the other holes and put all the parts through again without disturbing the setting of the location stops.

The detail drawings are, I hope, sufficiently clear without any further explanation. The dimensions can be modified to suit the class of work to be done, and the taste of the worker. For a really first-class job, all parts should be hardened and ground, but few of us have facilities for such refinements. The bushes must be hardened, of course, and it would be better if the vee-blocks were, at least, skin-hardened on the locating faces.

Holding a Small Drill in a Collet

Recently I had a job where No. 80 holes were required to be drilled, but I was unable to obtain a chuck that would close on a drill so small. The difficulty was overcome by inserting three pieces of wire in a $\frac{1}{8}$-in. collet and placing the drill in the centre. When the collet was tightened, the drill was held perfectly true.



The diameter of the wire required can be found by subtracting the drill radius from the collet radius.—A. RICHARDS.

Queries and Replies

Enquiries from readers, either on technical matters connected with model engineering, or referring to supplies or trade services, are dealt with in this department. Each letter must be accompanied by a stamped, addressed envelope, and addressed : " Queries Dept.," THE MODEL ENGINEER, 23, Great Queen Street, London, W.C.2.

Queries of a practical character, within the scope of this journal, and capable of being dealt with in a brief reply, will be answered free of charge.

More involved technical queries, requiring special investigation or research, will be dealt with according to their general interest to readers, possibly by a short explanatory article in an early issue. In some cases, the letters may be published, inviting the assistance of other readers.

Where the technical information required involves the service of an outside specialist or consultant, a fee may be charged depending upon the time and trouble involved. The amount estimated will be quoted before dealing with the query.

Only one general subject can be dealt with in a single query ; but subdivision of its details into not more than five separate questions is permissible. In no case can purely hypothetical queries, such as examination questions, be considered as within the scope of this service.

No. 9895.—Batteries
A. J. (Carnforth)

Q.—Will you please explain the principles of a steel plate alkaline battery, compared with the lead acid type—advantages and disadvantages, whether it is possible to make them at home, and if so, addresses of possible suppliers of requisite materials.

R.—The best-known type is the nickel-iron or nickel-cadmium type, which uses an electrolyte of either caustic soda or caustic potash. There is another type in which the electrodes are nickel and silver respectively, which has some advantages, particulary in small sizes. These batteries are considerably lighter, though more bulky than lead cells, and are not subject to deterioration by sulphating and similar effects. Therefore, they generally have a much longer life, especially in conditions where servicing is not as good as it should be. The voltage of these cells is only 1.25 V per cell, and, therefore, a larger number of cells is required in the case of lead batteries, which is 2 V per cell. The mechanical strength of the batteries is much greater than lead cells, and they will also stand extremely rapid discharge or even short circuiting without damage. We do not think it is possible to make such batteries at home, and in the circumstances, we cannot refer you to the address of any possible suppliers of material. The principal makers of alkaline batteries in this country are the Nife Battery Co. Ltd., Redditch.

No. 9908.—Adapting M.L.7 to Treadle Drive
J. E. J. L. (Oxted)

Q.—Although a beginner to lathe work, I have placed an order for an M.L.7, but unfortunately these premises are not supplied with mains electricity. Therefore, I wish to make a treadle stand adaption as per the article in the issue of April 13th, 1950. However, to save expense, I am constructing my own bench stand and endeavouring to obtain a suitable foot motor or flywheel and treadle. Could you please advise me as follows :—

(1) I have an offer of a flywheel and plate from an M.L.4 16 in. (1 in.), 15 in. (⅞ in.), 5⅝ in. (1⅛ in.), weight 45 lb. Is this suitable, and if so, what pulley sizes must be used on the intermediate countershaft ?

(2) Is there a fixed method of determining the pulley wheels in relation to the size of the flywheel and mandrel speed (if critical), as I may have to find another treadle.

(3) What weight wheel is necessary ?

(4) Is a 1-in. belt too heavy ?

R.—You may have some little difficulty in adapting your M.L.7 lathe to treadle drive, in view of the fact that this lathe is, to the best of our knowledge, exclusively equipped with vee-belt drive, and it would, therefore, be necessary to convert your treadle flywheel also to take vee-belt, which would call for remachining, as we do not think that any treadle pulleys are at present made with vee-grooves. There is, however, an alternative method of working by utilising the M.L.7 countershaft and taking a single-speed drive from the flywheel, either by vee- or flat-belt. With reference to your specific questions :

(1) The treadle from the M.L.4 lathe would probably be quite suitable, if adapted in the way described, but we regret that we are unable to advise you as to pulley sizes to be used. If a single-speed belt drive from the treadle is employed, it should be geared in such a way as to produce a speed of approximately 300 to 400 r.p.m. on the countershaft at normal treadle speed.

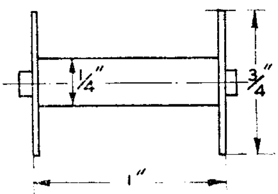
(2) A method of calculating pulley wheels on treadle shafts and lathe mandrels was given in the issue of THE MODEL ENGINEER dated April 20th, 1950.

(3) Generally speaking, the heavier the treadle flywheel the better, and flywheels up to as heavy as 2 cwt. have been used with advantage. We do not recommend going much below 35 to 40 lb. for a lathe of this type.

(4) A 1-in. belt would probably take up more room than is generally available on a stepped pulley and a ¾-in. belt is more common, but a 1-in. belt would be used with advantage for a single-speed treadle drive countershaft.

No. 9922.—An Overload Cut-out
D. E. R. (Southfields)

Q.—I have built a 12 V 1 A rectifier controller to work a small "OO"-gauge layout, and wish to make an overload cut-out to suit this. I already have the mechanism, which was rated far too high at 5-10 A. Could you, therefore, give me the



wire size, turns, etc., for the solenoid, as per sketch herewith. I want the cut-out to operate at the 1 A limit.

R.—Wind your bobbin full with 24-sw.g. plain enamel-covered copper wire, making your cut-out adjustment by a spring control for the chosen load setting.

No. 9909.—Surplus Rotary Blower
C. G. H. (Pullborough)

Q.—I have a small motor-driven fan which was originally used as a valve and cooling fan in certain service sets. I am anxious to use this fan for blowing the fire in my 1½ in. scale traction engine. Its dimensions are as follows: side suction opening 1 in. diameter, tangential delivery (rectifier) 1½ in. × 1 in. When working with delivery pulley open, i.e., 1½ in. × 1 in. the blast is quite good with 15 V on the motor instead of the normal 24 V. However, to use the blower for steam raising, I completely blanked off the delivery and inserted a 5/32 in. internal diameter pipe in the middle of the blank. Very little air now issues from the reduced delivery, and the little bit of air that does issue from it is completely lost by the time it has reached the chimney jet, *via* 2 ft. 6 in. length of ⅛ in. internal diameter rubber tube. The chimney jet is simply a 2½ in. length of ⅛ in. diameter copper pipe inserted into the extension chimney. I increased the motor to 30 V, but it made no difference.

R.—Rotary fan blowers of the centrifugal type are only capable of producing a limited air pressure for a given speed of rotation, and unlike a reciprocating type of air compressor, the pressure does not rise if the outlet is restricted. Therefore, all that happens is that a restricted volume of air still at a very low pressure is discharged by the blower under these conditions. A centrifugal blower is not quite suitable for the purpose of operating an induced-draught type of blower as you suggest. It is, however, quite possible to use these blowers for steam raising by connecting the inlet of the fan to the chimney or uptake, so that the fan draws air directly through the furnace. Under such conditions, care must be taken to avoid the fan becoming over-heated by the hot air rising from the furnace, but if it is removed as soon as the fire is well under way, no harm is generally done, and many of our readers use small motor blowers of this type for steam-raising purposes.

No. 9910.—Screwcutting Dial
D. D. (Wednesbury)

Q.—I wish to make a screw-cutting dial for my lathe, the leadscrew of which is 1.5 diameter 4 t.p.i. Acme. I wish to know the following :—

(*a*) What diameter must the blank be for the pinion ?

(*b*) Number and forms of teeth required.

(*c*) Angle of teeth from centre-line.

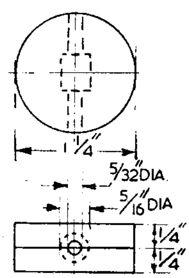
R.—(*a*) The calculation for the blank diameter of the pinion will depend primarily on the number of teeth to be used. As it meshes with a worm having a fractional inch pitch, the pitch measurement will have to be taken circumferentially, the pitch, of course, being ¼ in. taken on the pitch line, the usual addendum being allowed for the outside diameter.

(*b*) The number of teeth must be a multiple of the t.p.i. of the lead-screw, and it is suggested that 16 teeth would be suitable. The form is a standard worm tooth arranged for 29 deg. pressure angle.

(*c*) The angle of the teeth relative to the axis of the worm wheel will depend on the pitch angle of the lead-screw thread, which is influenced by the diameter of the lead-screw ; the larger the diameter, the closer the angle approaches to the axial line.

No. 9906.—Machining Problem
E. C. (Liverpool)

Q.—Can you help me out of a difficulty ? I have two brass discs 1¼ in. diameter × ¼ in. thick, and a hole is drilled and reamed through the joint. This bore has to be opened up inside (see sketch), and I should be obliged if you could suggest a method of doing this.



R.—The machining operation you describe certainly presents some difficulty, and we do not think that it would be practicable to chamber out the inner part of the bore while the discs are fastened together. Our suggestion would be to sweat the two discs together when drilling the 5/32 in. hole through the diameter on the joint line, then separate them and mill out the chambered portion by making a special cutter having a diameter of $\frac{5}{16}$ in. and a 5/32 in. shank, extended at both ends for a sufficient distance to enable it to be run between centres or in some similar manner in the lathe or drilling machine. The discs could then be fastened in turn to a vertical slide or angle-plate, and the cutter fed in to the centre until the shank makes contact with the bore of the 5/32in. hole. It is not necessary to make the cutter the full width, as it would probably be easier if made narrower and fed in two or three times to produce the required width.

PRACTICAL LETTERS

"Meat" for the "M.E."

DEAR SIR,—I have been a reader of THE MODEL ENGINEER since 1933, and have had my volumes bound from that date. Today, these volumes are invaluable, for, no matter what subject is sought, it is possible to obtain practical information and help from the pages of the journals. It is a curious fact that should some new interest be taken in a subject, very soon afterwards an article appears on that same topic.

I cannot write too highly in praise of the work of "Duplex"; these articles are outstanding with regard to the instruction and the manner in which it is imparted. For those who have not had the privilege of a mechanical training, the articles become a private tutor; and for those who have had, or who have worked in, a mechanical career, they serve as an incentive to produce better and more accurate work. Long may they continue!

The sale of the British railways in this country to the State has put an end to many a career; but, nevertheless, in my new work I still continue to find each new number of THE MODEL ENGINEER a source of help and entertainment, even as I did when a young apprentice in the railway shops just starting my training. That was in 1930. I was later to become assistant works manager in the Bahia Blanca shops of the Southern Railway and then for the last eight years until 1948 was assistant locomotive superintendent on the Midland, a metre-gauge railway. It would be too long to review all the articles which appeared in THE MODEL ENGINEER which contributed in some way or other in helping or in providing information which enabled me to carry out my duties. I can, however, mention "L.B.S.C.", whose locomotive experience and his practical notes were very often referred to. In one case, his instructions for valve-setting were almost completely translated into Spanish for the benefit of my foremen, as being the simplest and most practical exposition I have ever come upon.

Today, in work far removed from our beloved railways, I find that THE MODEL ENGINEER continues to provide this same help and, in addition, provides an everlasting source for the making of new friends and the creation of new interests.

My very best wishes for the future of "Ours" and for those engaged upon its production.

Yours faithfully,
Argentina. P. G. CURTIS.

High-pressure Model Locomotives

DEAR SIR,—I think you are being a little hard on the fellow who wants to use 150 lb. and a seven-flue superheater. As one of the few who have used this pressure on small locomotives, and for more than 20 years, I really cannot agree that there is any sufficient reason why a competent model engineer should not use it. I do, however, rather stress the "competent," as a 150 lb. boiler cannot be slung together with quite the abandon that is common with the 80 lb one. I do not know if there is any real advantage in using 150 lb. on a small-scale locomotive, probably not, but it is rather nearer to modern practice than 80 lb., which takes us right back to the dawn of railways.

High-pressure does, of course, mean a high tractive effort unless the cylinders are very small, but what of it? One cannot, of course, open the regulator with a late cut-off, but it does enable one to do the heaviest work with a short one; two of my locomotives have an adhesion factor of only $\frac{3}{4}$, yet they are by no means difficult to drive, and with three others it is no more than $1\frac{1}{4}$; against these figures, the $2\frac{1}{2}$ suggested by the editorial pen seems quite moderate. The small locomotive used to haul live passengers only looks like its full-size brother, its conditions of working and its vital proportions are and must be quite different.

As regards the superheater, I do not think shortage of steam need be feared even if seven flues be used, my L.M.S. compound has three flues and only three other tubes; but large numbers of flues and elements will not ensure high superheat unless certain vital proportions are right. I suggest your correspondent uses two 1 in. flues each containing two 7/32 in. elements in parallel, or better still, flues 1 in. inside diameter and $\frac{1}{4}$ in. elements.

Yours faithfully,
Bexhill-on-Sea. C. M. KEILLER.

The British Light Steam Power Society

DEAR SIR,—I was interested to read your reference to The British Light Steam Power Society in the May 3rd issue of THE MODEL ENGINEER, and as hon. secretary, thank you for the publication of the society's aims.

There is, however, one item which will give readers a false impression; I refer to the statement "a quarterly journal, *Light Steam Power*, is issued by the society . . ." *Light Steam Power*, which was instrumental in forming the society, is not issued by the society. It is an independent magazine, which publishes news of small power steam development from many sources, including reports of the activities of the British Light Steam Power Society, the latter being granted the use of its pages for society news of general interest to readers.

Will interested readers kindly note my change of address to:—Craig View, Cannan Avenue, Kirk Michael, Isle of Man.

Thanking you for your attention and trusting the above will forestall any possible misunderstanding in this matter.

Yours faithfully,
J. N. WALTON.
Proprietor: *Light Steam Power*; Hon. Secretary: The British Light Steam Power Society.

Rust Prevention

DEAR SIR,—Mr. A. E. Clawson (April 19th issue) uses a balloon fabric under the mackintosh cover for his lathe; this has to be "aired" frequently. If he lived in Lancashire he would have a permanent job "airing" for eight months of the year. I did not advise any cloth covers ("M.E.," March 1st) so there is nothing to be "aired." So keep the wheels turning, Mr. Clawson, and look for the "rust while you are resting."

Yours faithfully,
Bury. W. HEAPY.

CLUB ANNOUNCEMENTS

Old Oak Common Model Engineering Club

Through the generosty of the Railway Executive, this club has been provided with excellent premises which are now being adapted for use as a model engineering workshop, by the members themselves.

Many difficulties have had to be overcome but with the valued help of several Executive officers, to whom we are all very grateful, we shall soon have the workshop in full operation.

Hon. Secretary: A. J. BEER, 61, Warwick Road, West Drayton, Middx.

Eltham and District Locomotive Society

The next meeting will be held at the Beehive Hotel, Eltham, on June 7th, at 7.30 p.m., which will be a rummage sale. Members are specially asked to bring along any article from their workshop of which they wish to dispose.

At the last meeting, a fine show of work was produced by members. Mr. Powell and his son had a chassis of a 5-in. gauge "Butch" tank locomotive, only commenced in February. Mr. A. Brock brought the tender frames of his 3½-in. gauge "Adams" locomotive. Mr. S. Brock showed his 3½-in. gauge Pacific type locomotive chassis, a beautiful piece of workmanship. Mr. Peel showed the chassis of his 3½-in. gauge tank locomotive and the society's oldest and popular member, "Pop" Crampton, his side tanks for his nearly completed 5-in. gauge tank locomotive, *Ajax*.

Members are reminded that a society's track day at the permanent track site at Elliott's Sports Ground will be held on Saturday, July 14th. Several track runs have been arranged for garden fetes and sports days during the coming season, and members who are available are earnestly asked to be at these functions.

Visitors are cordially invited to the meetings.

Hon. Secretary: F. BRADFORD, 19, South Park Crescent, S.E.6.

The North London Society of Model Engineers

At the annual general meeting of the above society, held at the Eastern Gas Board's office recently, the secretary's report for the past year was lively and caused much discussion. It was heartily approved.

At the election of officers for the coming year some changes took place.

The meeting closed with a hearty vote of thanks to the council for their work during the past year.

Hon. Secretary: W. W. RANSOM, 14, Betstyle House, 197, Colney Hatch Lane, N.10.

Orpington Model Engineering Society

A most successful meeting was held on a recent evening when Mr. D. H. Chaddock brought along his turbine for a demonstration. After a most interesting talk on the difficulties encountered, and the ingenious methods adopted to overcome them, Mr. Chaddock steamed up the model and gave the audience an exciting few minutes. Several timed runs were given, and the highest gave a speed of 120,000 r.p.m. which sounds more amazing when regarded as 2,000 revs. per second!

Mr. Chaddock then told the meeting that this turbine is now obsolete, and that he is working on an even better one. Several pieces of the new job were handed round for inspection, and the society is anxiously awaiting the day when the new one is steamed. The O.M.E.S. wishes to thank Mr. Chaddock for a most interesting evening. As a final treat, Mr. Sherwood, who was in the audience, felt in his waistcoat pocket and brought out his latest "live steamer," a six-coupled locomotive built to run on "OOO" gauge; that is, ⅜ in.!

Will members please note that on the Hastings outing on June 10th all boat members are requested to turn up in force. The Hastings society is laying on pond and pole, and we must put up a show befitting Orpington.

Hon. Secretary: W. FRYATT, 68, Wellington Road, Orpington, Kent.

Sutton Model Engineering Club

The annual general meeting of the above club was held recently at the Angel Hotel, Sutton.

Addressing a well-attended meeting, the chairman, Mr. W. Savage, said that, owing to the illness of the treasurer the year's balance sheet would not be available, but the late treasurer, Mr. Warner Batts, had kindly offered to help in this direction. It would be necessary to call an extraordinary general meeting later in the year, when Mr. Batts would present the balance sheet and the club's financial position.

The chairman reported that good progress was being made with the building of the club house and it was hoped that by the end of the summer, members would have certain amenities and some degree of shelter.

After dealing with matters of interest to club members, a vote of thanks to the chairman and Mr. Warner Batts was proposed and seconded and the proceedings terminated.

Hon. Secretary: P. G. JOHNSTON, 9, Stanley Road, Sutton, Surrey. Vigilant 1150.

The Model Power Boat Association

At the committee meeting, held recently, several matters of interest to members were discussed.

Festival of Britain. Due to the obstructions in the form of stepping stones in the small pond on the South Bank site, the M.P.B.A. will not, after all, be demonstrating.

Special Regatta. The two-day regatta at Victoria Park to be held on June 16th and 17th will be as follows:—

Saturday, June 16th. 1. Nomination; 2. Steering; 3. Team Steering Competition.

Sunday, June 17th. Usual international programme. "A," "B," "C" and "C" (restricted) events.

The team steering competition is as follows:—

One team per club consisting of three boats.

Team is set to score 27 or more, but boats must take one run each in sequence until score is reached.

Time limit for each team, 12 minutes.

Winners will be the team that achieves the score in least number of runs.

Clubs which cannot provide three boats for a team will be allowed to nominate two only, and an extra boat will be allocated to them. Nominations for teams must be made in advance. Latest time 2 p.m. on June 16th.

Silencers. In accordance with the direction of the annual general meeting the following recommendations were adopted.

Four-stroke engines: The Burgess type seems satisfactory.

Two-stroke engines: Silencers should meet the following specifications:—

(1) Expansion chamber should have capacity of at least three times that of the cylinder.
(2) No direct outlet from ports to atmosphere. Exhaust should change direction and/or have/a baffle interposed.
(3) Final exit should not exceed total area of exhaust ports.

International Radio Controlled Models Society

Details of forthcoming meetings of the above society are as follows:—

Birmingham group. Saturday, June 2nd, at 2.30 p.m., in the History Classroom, University of Birmingham, Edmund Street, Birmingham. Meetings consist of a lecture on some aspect of the fundamentals of radio, followed by a talk or demonstration of equipment.

London group. Sunday, June 10th, at 2 p.m., at the Horseshoe Hotel, Tottenham Court Road, London. Discussion of arrangements for the stand at the "M.E." Exhibition. There will be no meeting in July due to the holidays, and none in August due to the "M.E." Exhibition.

Manchester group. Saturday, June 16th, at 2.30 p.m., at the Milton Hall, Deansgate, Manchester. Demonstration of a two-valve crystal transmitter by Mr. T. F. Sutton.

Tyneside group. Friday, June 29th, at 7.30 p.m., at 176, Westgate Road, Newcastle. Discussion on "Radio Control of Model Ships from the Practical Point of View."

Hon. Secretary: T. F. SUTTON, The Lodge, Manchester Grammar School, Manchester, 13.